The RUBBER AGE

January, 1945

ECHNOLOGY DEPT.

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R. T. VANDERBILT CO. INC. AMERICAN PRODUCTS

CUMATE

"Some Are Not Afraid to use it"—

•

Alone or along with Altax, CUMATE is the *Speed King* of Vulcanization for GR-S —yet is not Scorchy.

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SPEED · SAFETY · AVAILABILITY

See our Laboratory Report Booklet No. 4, June 1, 1944

R. T. VANDERBILT CO., Inc.
230 Park Avenue, New York 17, N. Y.

R. T. VANDERBILT CO. INC. AMERICAN PRODUCTS

Newsletter No. 1
JANUARY, 1945

Published by Rubber Chemicals Division of DU PONT

POLYAC—A NEW VULCANIZING ACTIVATOR

GR-I VULCANIZATES of the highest quality are obtained through use of Polyac as a vulcanizing activator. The use of Polyac with Thionex as the vulcanizing agents for GR-I results in so much improvement in rate of cure, resistance to heat aging (steam, hot water or hot air), compression set and cold flow properties, that this combination is rapidly becoming the standard for such stocks.

OUTSTANDING FEATURES of Polyac-Thionex combinations are:

1. Stiffening of raw stock.
2. Faster curing.
3. Safer processing.
4. Increased resistance of stock to steam—air cycles in curing bags and steam hose.
5. Increased viscosity of GR-I cements.

POLYAC-THIONEX cured GR-I stocks are especially recommended for inner tubes, steam hose and tire curing bags.

POLYAC may be used in conjunction with regular accelerators (preferably of the Thiuram type) but we recommend its use with Thionex specifically because the combination of Polyac and Thionex provides additional safety in processing.

POLYAC-THIONEX cured GR-I stocks have exceptionally high stress-strain values at low elongations. The usual high deformation of GR-I compositions with low loadings can be almost completely overcome and the stress-strain curve of a properly balanced Polyac-Thionex accelerated GR-I stock is almost identical with that of a corresponding high quality natural rubber stock.

POLYAC stiffens GR-I and results in uncured compositions that have less tendency to collapse after tubing or thin out during the vulcanization of inner tubes. The increased stiffness of the uncured stock should not be confused with scorchiness. The effect is entirely different and, if undesirable, can be offset by the use of softeners.

Comparison of the physical properties of two typical GR-I stocks, one accelerated with Polyac-Thionex, and the other with MBT Thiuram M acceleration, is shown in Table I.

TABLE I

	Compound 1	Compound 2
Acceleration	**Thiuram M 1.0% MBT 0.5%**	**Thionex 1.0% Polyac 0.5%**
Plasticity-Recovery		
Original	**119-14**	**113-15**
After 30 minutes at 250° F.	**131-15**	**142-29**
Set-Up Cure—30 min. at 250° F.	**Porous**	**Porous**
Physical Tests (10 min. at 298° F.)		
Original		
Modulus at 500% Elongation—psi	**625**	**900**
Tensile Strength at Break—psi	**2125**	**2025**
Elongation at Break—%	**930**	**860**
Hardness—Shore	**56**	**47**
Tear Strength at 100° C.—lbs. per in.	**160**	**215**
Permanent Set (ASTM)—%	**290**	**155**
After 48 Hours' Aging in Air at 100° C.		
Modulus at 500% Elongation—psi	**1300**	**1400**
Tensile Strength at Break—psi	**2175**	**2150**

COLORS—We have on hand stocks of all colors, both powdered and GR-S dispersed. Refer to Blue Report No. 156 for a complete description and list. If you have not yet had samples and wish them, please write us.

THIONEX is one of the most interesting, versatile, and economical accelerators for GR-S. Can be used alone, as a primary or as a secondary accelerator with excellent results. Try it.

GR-S TIRES—The extensive tests that have been made give a background of service experience on tires accelerated with 2-MT-Accelerator 808 that confirms the faith in this accelerator combination and the wisdom of its choice. Our tire specialists will be glad to discuss these results with you.

BARAK—Have you tried it as an activator in GR-S stocks?

BUY WAR BONDS

DU PONT
RUBBER CHEMICALS DIVISION
BETTER THINGS FOR BETTER LIVING . . . *Through Chemistry*

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Hycar

Reg. U. S. Pat. Off.

synthetic rubbers now off WPB allocations

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

EFFECTIVE January 1, 1945, Hycar OR-15, Hycar OR-25, and Hycar OS-10 are no longer subject to allocation by the War Production Board.

The provisions of Rubber Order R-1 regarding end use and inventory are now applicable to Hycar, the same as to any other general purpose rubber.

All you have to do to get these materials now is to place your order directly with us.

It is no longer necessary to order your Hycar requirements on a monthly basis. By ordering as you normally would, you will help level off our first-of-the-month peak and increase our ability to handle your order promptly.

As usual, Hycar's Technical Service Staff is at your service, ready to help you with your individual problems. *Hycar Chemical Co., Akron 8, Ohio.*

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

Hycar

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Synthetic Rubbers

FOR A

HAPPY NEW YEAR

USE

PHILBLACK A

the easy-processing, low hysteresis, new HMF type black

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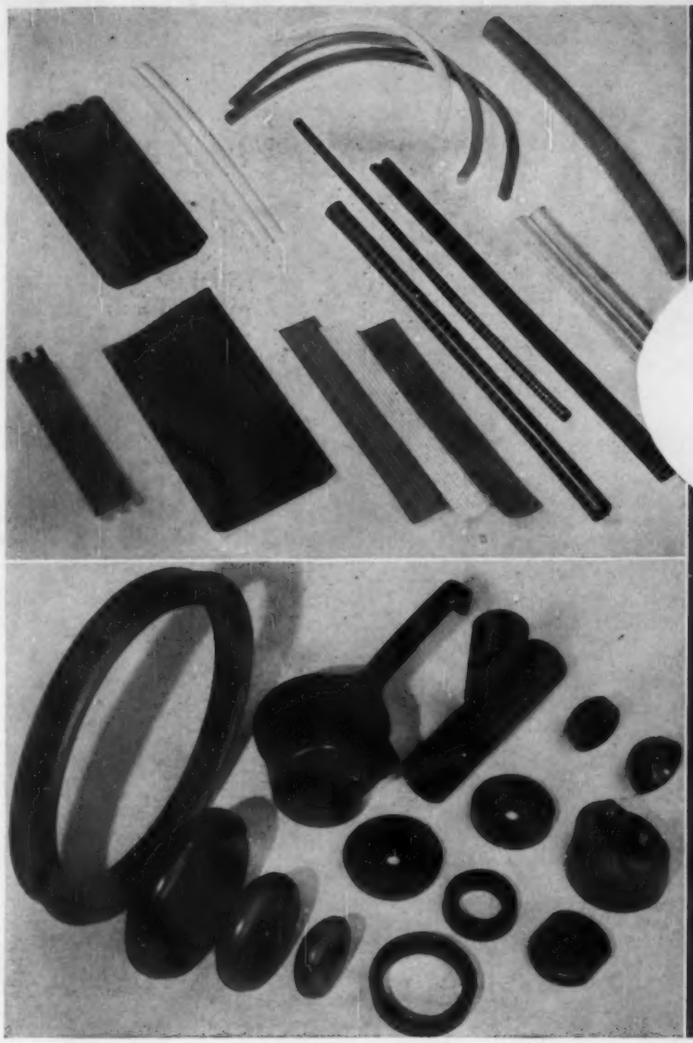
Philblack Division

First Central Tower—Akron, Ohio

(HAVE YOU ENTERED THE CHICAGO RUBBER GROUP CONTEST?)



MOLDED GOODS OF Geon

A few of the thousands of possibilities for these polyvinyl materials

THE GEON family of polyvinyl resins and plastics provided the raw material for all the molded items in the picture. Some were compression molded, some injection molded, some extruded. Some are elastic, some rigid.

But they have several things in common. For example, all the items were processed on standard molding and extruding equipment. Production time for all of them was *fast* because curing time is eliminated when GEON is used. They represent a broad range of color that is not available with most elastic materials. Each of them represents a specific *combination* of properties designed to meet specific service conditions.

Doesn't all of this mean that one of the GEONS can help you solve an application problem? What properties do you need—and in what combination? Resistance to sun, heat, cold, air, acids, alkalies, oils and greases, gasolines, foods, abrasion? Do you want your product to be brightly colored or made in a delicate pastel shade? Do you want a glossy or dull finish? With GEON you can have these and many other unusual properties in the right *combination* to meet your needs.

Right now all the GEONS are subject to allocation by the War Production Board. Limited quantities may be had for experiment. And our development staff and laboratory facilities are available to help you work out any special problems or applications. For more complete information write Department KK-1, Chemical Division, The B. F. Goodrich Company, 324 Rose Building, Cleveland 15, Ohio.

Geon
Polyvinyl Materials

CHEMICAL DIVISION
THE B. F. GOODRICH COMPANY
324 ROSE BUILDING • CLEVELAND 15, OHIO

How to step up strainer output

NATIONAL RUBBER strainer heads have been re-engineered for more efficient operation. Power-operated and precision built, these new clamp-type heads swing open quickly and smoothly, greatly reducing the downtime of the machine. Screen changes that once took five to ten minutes, and more, now are being made in less than one minute.

When condition of the stock calls for screen changes every 20 to 30 minutes, these fast-opening heads are adding five to six hours useful production every 24 hours.

The ease and simplicity with which these new heads can be opened encourages operators to change screens frequently and so maintain production, rather than wait until the screen becomes so clogged that output is cut down to a fraction of what it should be.

Because of the time and labor saved, National Strainers are being hailed by users as one of the most important recent developments in rubber reprocessing.

This is a typical example of National Rubber's creative engineering . . . it is developments of this kind, by working hand in hand with rubber company engineers, that have established National's leadership in the rubber machinery field.

Above — National 8½" Heavy Duty Strainer with air-operated intermittent cut-off.

Inset — Close up of Quick-opening strainer head equipped with motor driven continuous cut-off

NATIONAL RUBBER MACHINERY CO.

General Offices: AKRON 11, OHIO

Creative Engineering

Yes . . .

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That name is

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IT IS MADE especially for *you* as a primary product — *not* as a by-product.

IT IS MADE by large-scale production methods that bring it into the low-priced field.

IT IS MADE under rigid supervision to insure uniformly high quality.

MULTI-PLAST is brought to you by our technical representatives, experienced men with a know-how in rubber compounding. They can give you helpful suggestions on the use of MULTI-PLAST for low-cost high-quality compounding.

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REG. U. S. PAT. OFFICE

The booklet, "TENSILE STRENGTH TABLE", designed as an aid in your physical testing laboratory is available. Write for your copy.

WILMINGTON

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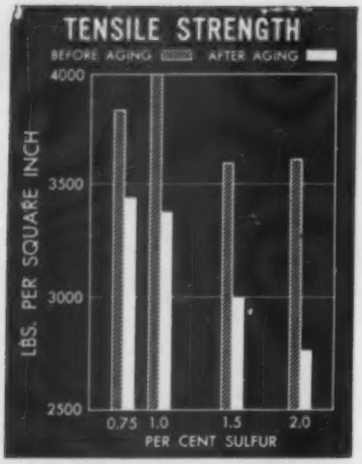

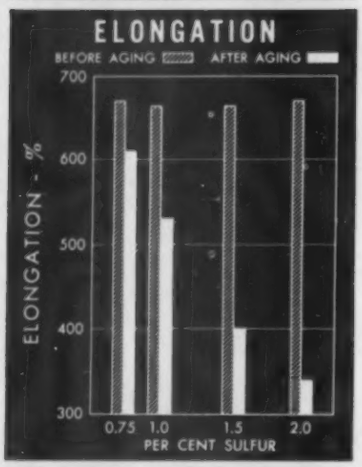

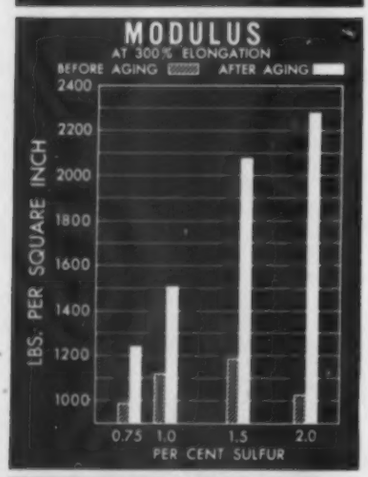

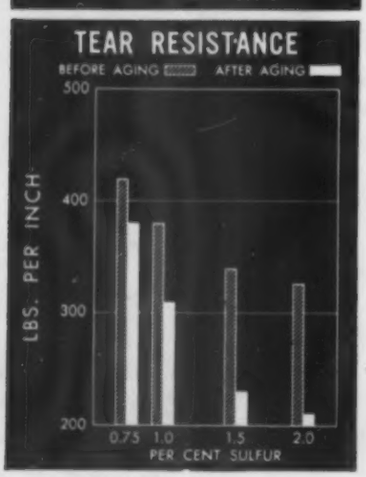

Give your GR-S Compounds heat stability provided by low sulfur content

Safe, fast curing now made possible by FBS LITHARGE

As you know, reduction in sulfur content means increase in heat stability.

It has now been demonstrated that FBS litharge (plus benzothiazyl disulfide) makes low sulfur formulas practicable.

Why?

Because it speeds up greatly the rate of cure without increasing the risk of scorching.

Thus, even though the normal quantity of accelerator is used, *the sulfur content can be reduced.*

Note, in the series of tests charted and tabulated, the superior behavior of the 0.75 and 1.0 sulfur formulas.

FORMULA

GR-S (Institute)	100
E.P.C. Carbon Black	50
Zinc Oxide	3
Coal tar softener	5
Benzothiazyl Disulfide	1.0
FBS Litharge	1.5
Sulfur	variable

Effect of Varying Amounts of Sulfur on Physical Properties

(Curing period: 20 min. Temp: 287° F.)

% Sulfur	*Tensile Strength*	*% Elongation*	*Modulus at 300% Elong.*	*Tear Resistance*
0.75	3840	670	980	420
1.0	4000	665	1120	380
1.5	3600	665	1190	340
2.0	3620	670	1025	325
After Aging 24 Hours at 100° C.				
0.75	3460	610	1240	380
1.0	3380	530	1510	310
1.5	3000	400	2080	230
2.0	2770	340	2280	210

CONCLUSIONS:

1. FBS Litharge-thiazole with low sulfur imparts heat stability.
2. Modulus is high and steady.
3. Elongation is retained despite exposure to heat.
4. Heat stability prevents brittleness and improves tear resistance.
5. Rate of cure is relatively fast, without tendency to scorch.
6. The combination is inexpensive and efficient.

Ask us to send you a printed report, "Compounding of GR-S for Heat Resistance," issued by the Rubber Division of our Research Laboratories, which covers the subject of FBS Litharge for low sulfur formulae in greater detail and from a number of additional angles.

NATIONAL LEAD COMPANY New York, Buffalo, Chicago, Cincinnati, Cleveland, St. Louis, San Francisco: Boston (National-Boston Lead Co.); Pittsburgh (National Lead & Oil Co. of Penna.); Philadelphia (John T. Lewis & Bros. Co.).

PELLETEX for Punishment!

Photo courtesy
B. F. Goodrich Co.

Airplane tires require great carcass strength, resistance to extreme temperature changes, intense sunlight and good aging properties. That's why PELLETEX and GASTEX, the leading semi-reinforcing furnace blacks, are so generally used by manufacturers of tires for this type of severe service.

Another reason for PELLETEX and GASTEX preference in compounds of both natural and synthetic rubber is their easy processing properties which facilitate the handling of ply stocks at high speed.

Your technical inquiries to our engineering staff are invited.

HERRON BROS. & MEYER

OHIO BLDG., AKRON, OHIO.

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AS EMULSION AND LATEX STABILIZERS
FOR THE COMPOUNDING OF SYNTHETIC
AND NATURAL LATICES.

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Surface Active Agents (wetting, dispersing, stabilizing), Rubber Age-resisters and Accelerators, Coating, Impregnating and Sizing Compositions, Resinous Products.

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UNITED manufactures every type of roll used in the production and processing of natural or synthetic rubber. The superiority of UNITED ROLLS has been demonstrated for more than 30 years in plants of the principal rubber manufacturers of the world.

Comprehensive technological experience, advanced engineering skill, modern production facilities, and UNITED'S internationally recognized leadership in the design and construction of rolls are your guarantee of complete satisfaction.

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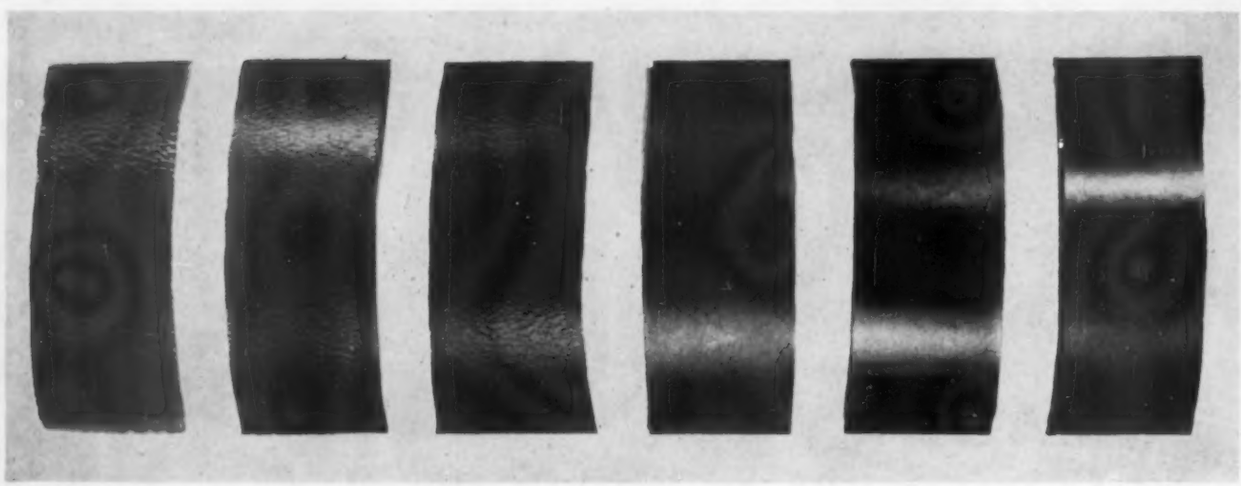
The World's Largest Designers and Makers of Rolls and Rolling Mill Equipment

ANTISOL

WILL PROTECT GR-S AGAINST ATMOSPHERIC CRACKING

EXPOSED TO DIRECT SUNLIGHT FOR 50 DAYS



Control (no wax)	Paraffin 4%	Antisol 1%	Antisol 2%	Antisol 3%	Antisol 4%

HERRON BROS. & MEYER

82 Beaver Street, NEW YORK 5, N. Y.

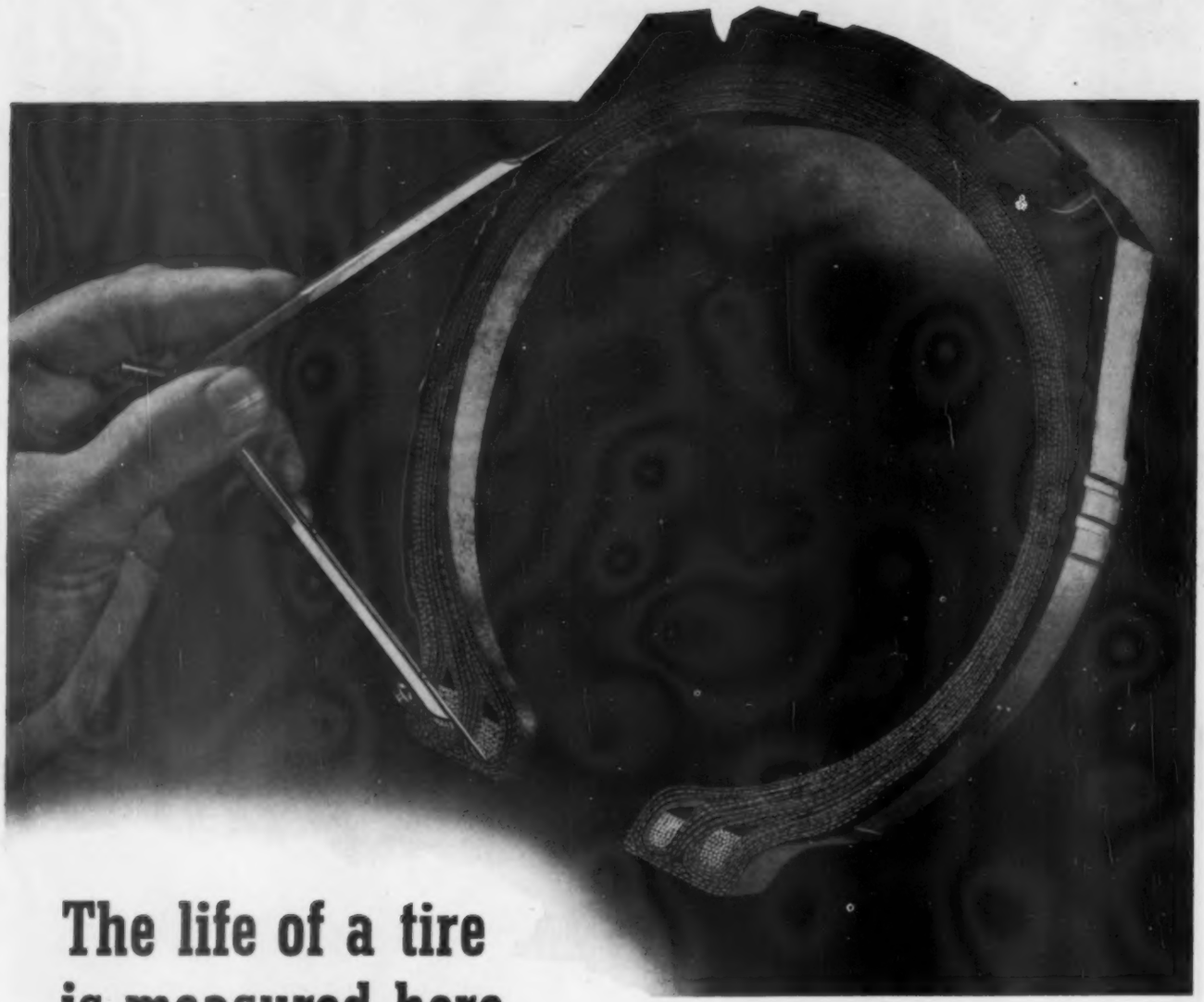
516 Ohio Bldg., AKRON, OHIO

WHEN the war ends and you are again in business for yourself, making rubber products for peacetime consumption, we want you to take advantage of all that Philadelphia Rubber has to offer. We want you to profit from our *new* knowledge of reclaim compounds, gained through the accelerated and far-reaching research made necessary by the war.

For example, Philadelphia Rubber development has established the facts that reclaim is just as compatible with GR-S as it was with natural rubber; that the compounding of GR-S with reclaim makes possible faster mixing and faster cures. This means lower cost of your finished product which will make your sales position better in the competitive market that is sure to return.

No organization in this country is better equipped to help you with problems involving the use of reclaim. We sincerely invite you to make use of our experience, our laboratory staff and facilities in solving any reclaim problems that you may have now or in the future. The Philadelphia Rubber Works Company, 324 Rose Building, Cleveland 15, Ohio.

PHILADELPHIA
RECLAIMED RUBBER



The life of a tire is measured here

SURE, it's the tread on a tire that is actually *worn away.* But the tread can be replaced again and again. The real *life* of the tire is determined by the *carcass,* and the *bead.* That's because, no matter how fine or how frequent your recap jobs, a tire just *can't live longer* than any *one* of these *vital parts.*

The bead, especially, is an extremely *critical part* of a tire's structure. And it is only by the use of high quality steel wire, correctly applied in the bead construction, that tires have the strength and rigidity necessary for long trouble-free service. So no wonder leading tire manufacturers set such high standards of workmanship and specify National-Standard steel wire for bead making.

In close cooperation with rubber engineers, National-Standard is continually developing better and better wire for tires and scores of other wire-and-rubber applications. Since the early days of the rubber industry, improving the quality of wire for tires and developing time-saving wire applying machines, has been one of our primary concerns.

Take advantage of our skill and experience by letting us help you work out new uses for wire-and-rubber in your products.

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Phenolic Resins
Urea Formaldehyde Resins
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Melamine Resins
Styrene Resins

and

3. Improved Properties

to

Buna-S
Buna-N
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Established 1857

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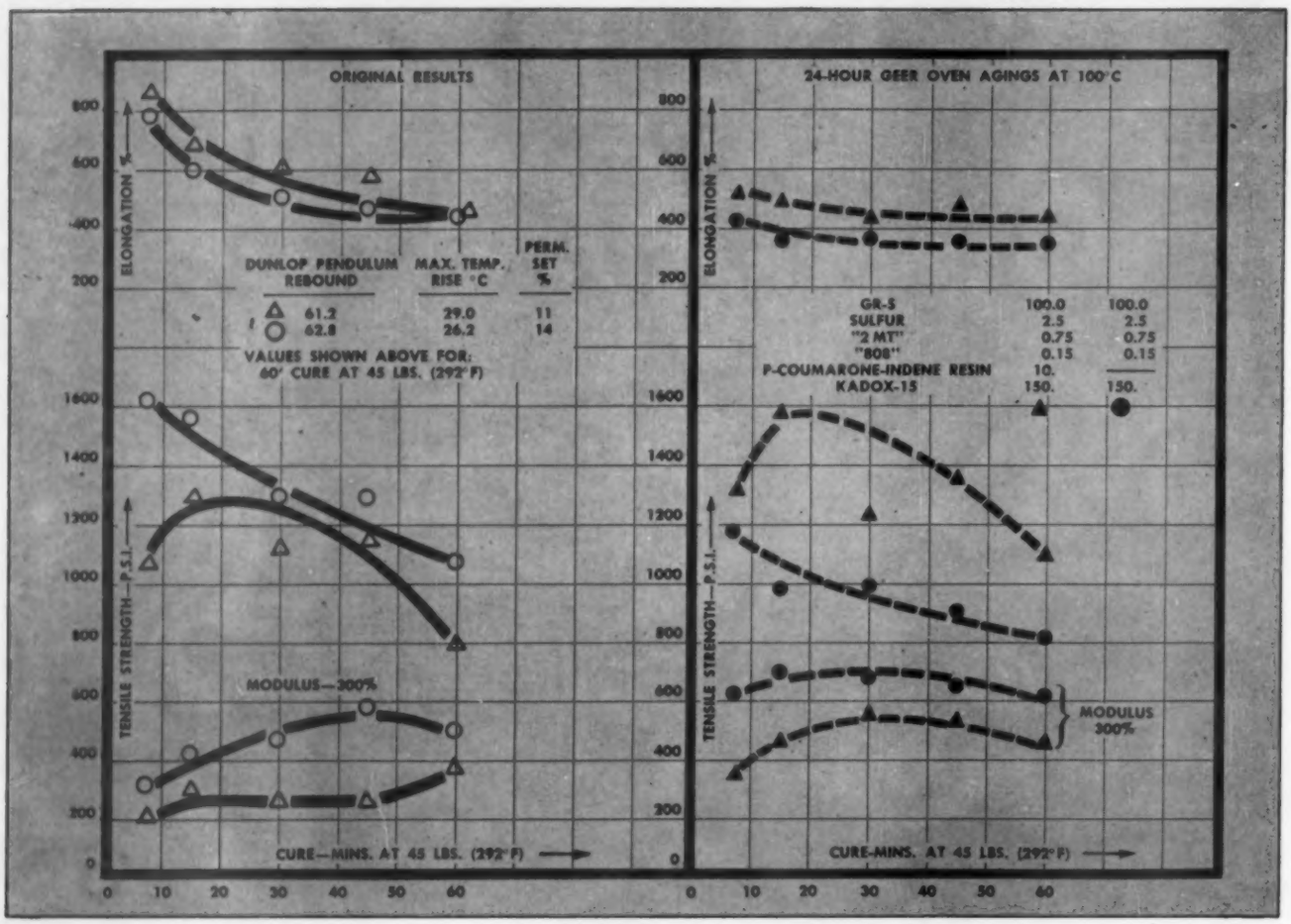
Baker Plasticizers Contain NO Phthalate

Technical Bulletin No. 7

on the Compounding of GR-S with Substantial Loadings of Zinc Oxide

"2MT"-"808" ACCELERATION

Effect of p-coumarone-indene resin on initial and aged properties



In the absence of p-coumarone-indene resin, the tensile strength "peaks" at an early cure and progressively declines during the 60 minute interval. The 24-hour Geer aging results at 100°C. show correspondingly lower values.

The addition of 10 parts of p-coumarone-indene resin, however, flattens out the initial curing curve and the aged values are higher than the original results. The modulus after aging of the compound containing p-coumarone-indene resin is advantageously lower than the control.

Uniform Quality

HORSE HEAD ZINC OXIDES

THE NEW JERSEY ZINC COMPANY

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***Products Distributed by* THE NEW JERSEY ZINC SALES COMPANY**

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Once Again in War Time—

we extend to you our best wishes
and our hope for early peace —

And Final Victory
In the New Year

PEQUANOC RUBBER CO.

QUALITY RECLAIMS FOR SPECIFIC PURPOSES

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Carpet Backing
Can Sealing
Cable and Wire
Combining Compounds
General Adhesives
Hose and Belting
Impregnating Compounds
Pile Fabrics
Protective Clothing
Shoe Adhesives
Sizings

A practical approach to the use of synthetic dispersions in your product is to refer your problem to our laboratory. No matter what the process—coating, impregnating, or bonding—our experienced technical staff can compound the material best suited to your requirements. In the case of an entirely new product, we will work out all the details of manufacturing procedure—from pilot operations to commercial production in your plant. Why not talk it over with one of our technical representatives?

GRS latex types 2 and 3, normal and concentrated, available from stock.

A Complete Service to Manufacturers

RESEARCH · MATERIALS · ENGINEERING · MANUFACTURE

General Latex & CHEMICAL CORP.

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Agents for Rubber Reserve Company for storage and distribution of natural rubber latex. Distributors for Rubber Reserve Company for synthetic latex. Operators of the Government-owned Baytown, Texas, synthetic rubber plant in collaboration with the General Tire & Rubber Co.

NET WEIGHT 25 LBS.
XIE 20 DIXIE 2
UNITED CARBON COMPANY Inc.
DIXIE 20
DUSTLESS - CARBON BLACK
U.S.A.
XIE 20 DIXIE 2
MADE IN U.S.A.
PATENTS APPLIED FOR

DIXIE 20

DIXIE 20 is a semi-reinforcing (SRF) type carbon black made by United's special furnace process.

IDEAL for the GR-S and other rubbers used in military and civilian goods.

OUTSTANDING for ease of processing, good plasticity, fast rate of cure, high resiliency, and low heat build-up.

WELL-KNOWN for uniform quality and performance.

RECOMMENDED for blending with channel black for moderate reinforcement and low heat build-up.

DIXIE 20 is a Strong Rubber Favorite.

RESEARCH DIVISION

UNITED CARBON COMPANY, INC.

Charleston, West Virginia

NEOPRENE PEPTIZER P-12

Alleviates Premature Polymerization of Neoprene Stocks During Storage Period

PEPTIZER P-12* maintains plasticity of mixed Neoprene stocks during bin storage and is particularly effective in Neoprene coated fabrics which are stored for later use. The material is a white, free-flowing, non-packing, powdered solid with a specific gravity of 1.04.

P-12 is a true PEPTIZER of GN Neoprene and does not retard cure. It is definitely not an "antiscorch" or "retarding" agent in the generally accepted sense of these terms. However, scorching due to nerve, in processing stocks which have "toughened" in storage, can be prevented by using P-12. This is the only sense in which it can be considered an "antiscorch."

In use, P-12 is added early in the mixing cycle. It is an aid to the dispersion of pigments.

A Descriptive Circular is Available
. . . . . Write for it Today

•

THE CALDWELL COMPANY

2412 First Central Tower,
AKRON 8, OHIO

(*) *Patent Applied For*

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TRENTON
H. N. Richards Company,
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Trenton, N. J.
Phone: Trenton 3-4186

HERE IS A PRIZE CONTEST
Any One Can Enter!..

Yes, regardless of who you are or where you live within the boundaries of the United States or Canada, you may enter this great contest to aid America solve a perplexing problem — how best to utilize synthetic rubber scrap. Be sure to read every detail of this contest as explained below . . . then decide to enter and compete for one of these worthwhile prizes.

A group of rubber technologists identified with the rubber industry, known as the Chicago Rubber Group, is offering three prizes, totaling $1000.00 for the best papers on the utilization (reclaiming and processing) of cured synthetic rubber scrap. While the papers may deal with any phase of the problem, here are some subjects which suggest themselves: 1. Separation and segregation of synthetic scrap rubber. 2. Methods of identification of synthetic scrap rubber. 3. Reclaiming of synthetic scrap rubber. 4. Compounding studies which will result in greater use of reclaimed synthetic scrap, or of ground synthetic scrap rubber.

First prize: $500.00; second prize: $300.00; third prize: $200.00. If you feel that you have ideas of value for this contest, be sure to enter! You may win one of these substantial cash prizes.

READ THESE SIMPLE CONTEST RULES:

This contest is open to anyone in the United States or Canada excepting officers and directors of the Chicago Rubber Group for 1943-45. Selection of subject matter is left to the discretion of the contestant. As many papers as desired may be submitted by any one contestant. Papers should be based upon information which has not previously been presented before any technical society meeting or published in any trade magazine. Contest closes at midnight on August 1, 1945. Awards will be made during the fall meeting of the American Chemical Society in Chicago, 1945. The decision of the judges will be final. Each author must submit three copies of his paper to Mr. A. R. Floreen, Vice-President, City National Bank & Trust Company, 208 S. La Salle St., Chicago. These three copies will be judged separately by the Rubber Manufacturers Association, the Rubber Reclaimers Association and the Rubber Division of the American Chemical Society. The judges will report their findings to Bruce W. Hubbard, Chairman, Chicago Rubber Group, 2512 W. 24th Street, Chicago, to whom all inquiries for additional information should be addressed.

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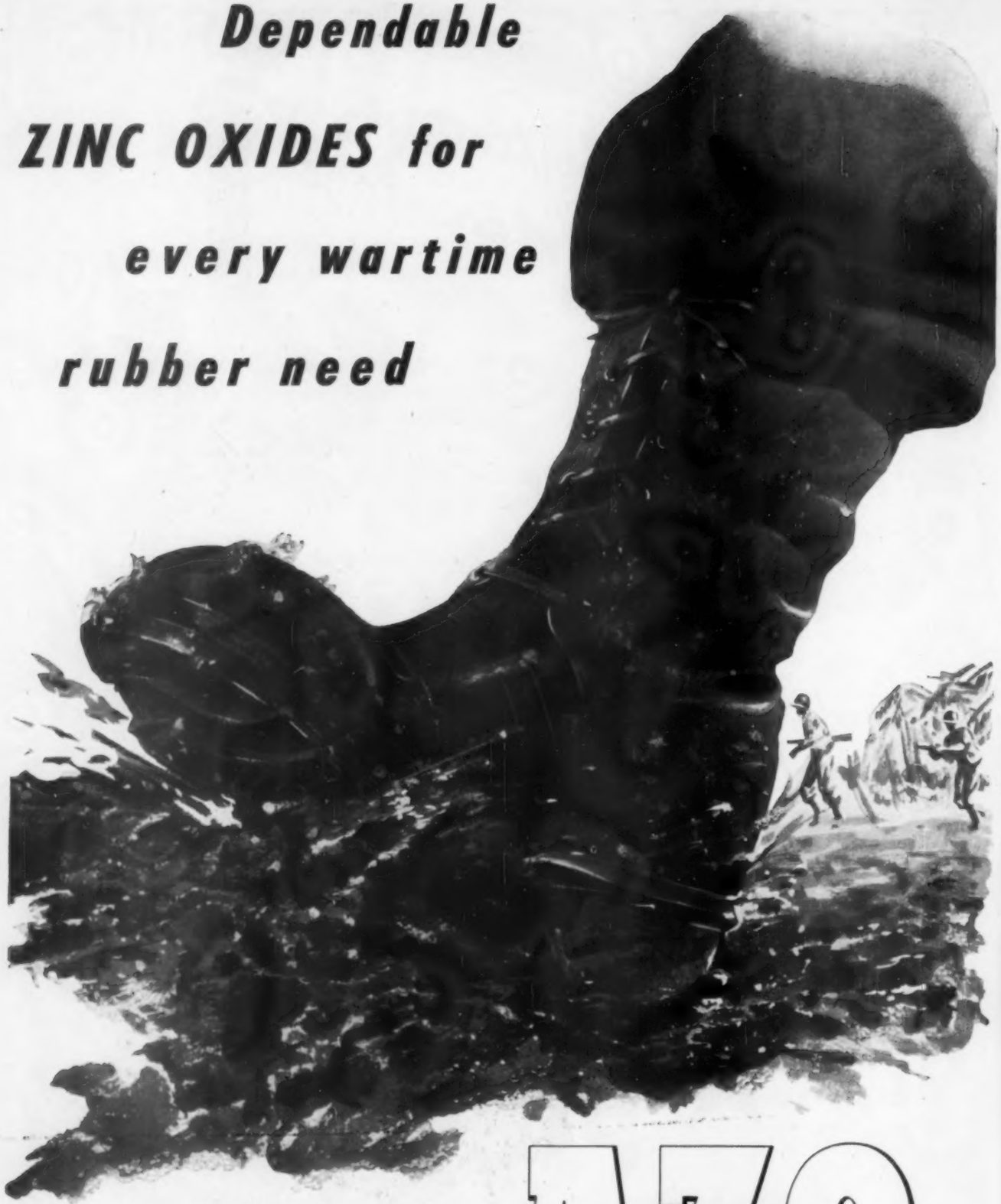

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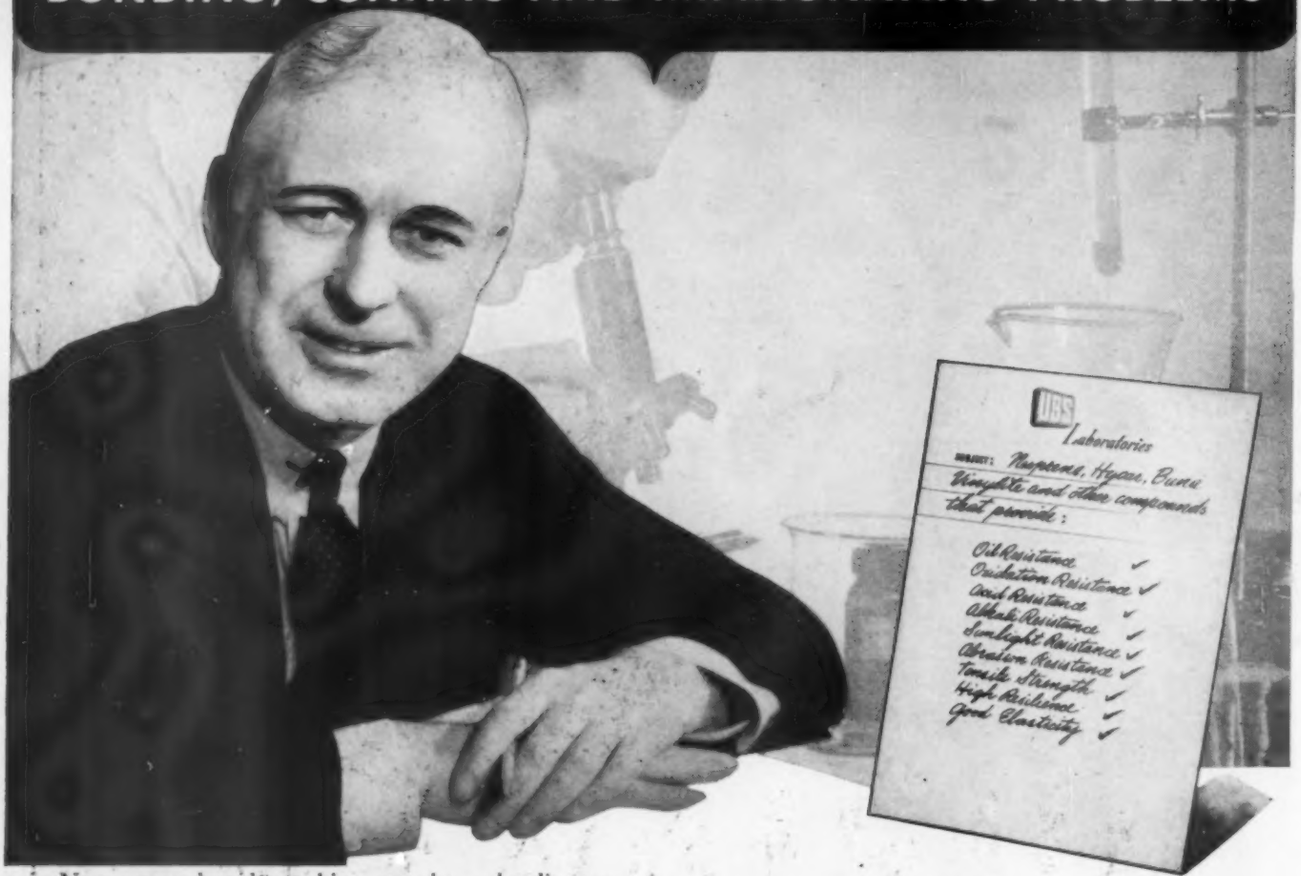

No matter what the problem may be — *bonding neoprene, rubber and other coated or moulded parts to any ferrous or non-ferrous metal; corrosion proofing chemical tanks and equipment; laminating leather belting; coating magneto parts; combining or coating fabrics; impregnating paper; cementing various materials together; insulating wire and other articles; etc.* — you will find the UBS Laboratories equipped to provide (or develop) a formula that will fill your needs. Long-time specialists in the field of industrial Bonding, Coating and Impregnating Compounds, the UBS Laboratories not only know thoroughly the compounding advantages and limitations of all the latest synthetics, but even have developed an original synthetic latex and synthetic rubber of their own. *Write today, describing your Bonding, Coating, or Impregnating Problems.*

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Produced in three modifications to meet the varying requirements encountered in rubber manufacture.

	VULTAC #1	VULTAC #2	VULTAC #3
Type Alkyl Phenol Sulfide	Monosulfide	Disulfide	Disulfide
Sulfur content	13%	23%	28%
Color and form	Soft brown resin	Hard brown resin	Hard brown resin
Softening point ASTM E28-36T	45-55°C	55-65°C	70-80°C
Specific Gravity 25/25°C	1.11-1.12	1.16-1.17	1.19-1.20
Recommended Use	General Purpose Vulcanizing Tackifier	Primary Vulcanizing Agent for GR-S	Primary Vulcanizing Agent for Buna N polymers
Recommended Proportion	10-25 parts PHR with decreased sulfur	6-10 parts PHA	5-9 parts PHR

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In order to gauge properly the value of the St. Joseph Lead Company as a source of supply for its justly famous, lead-free zinc oxides, the following procedure is as simple as it is conclusive: Ask anyone of the many manufacturers in the rubber, paint and allied industries who use St. Joe Zinc Oxides — or any score of them — what they think of this Company, and they will tell you that the quality of the products and service we give them justifies the orders they give us.

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A *Banbury Mixer is composed of 775 different parts.*

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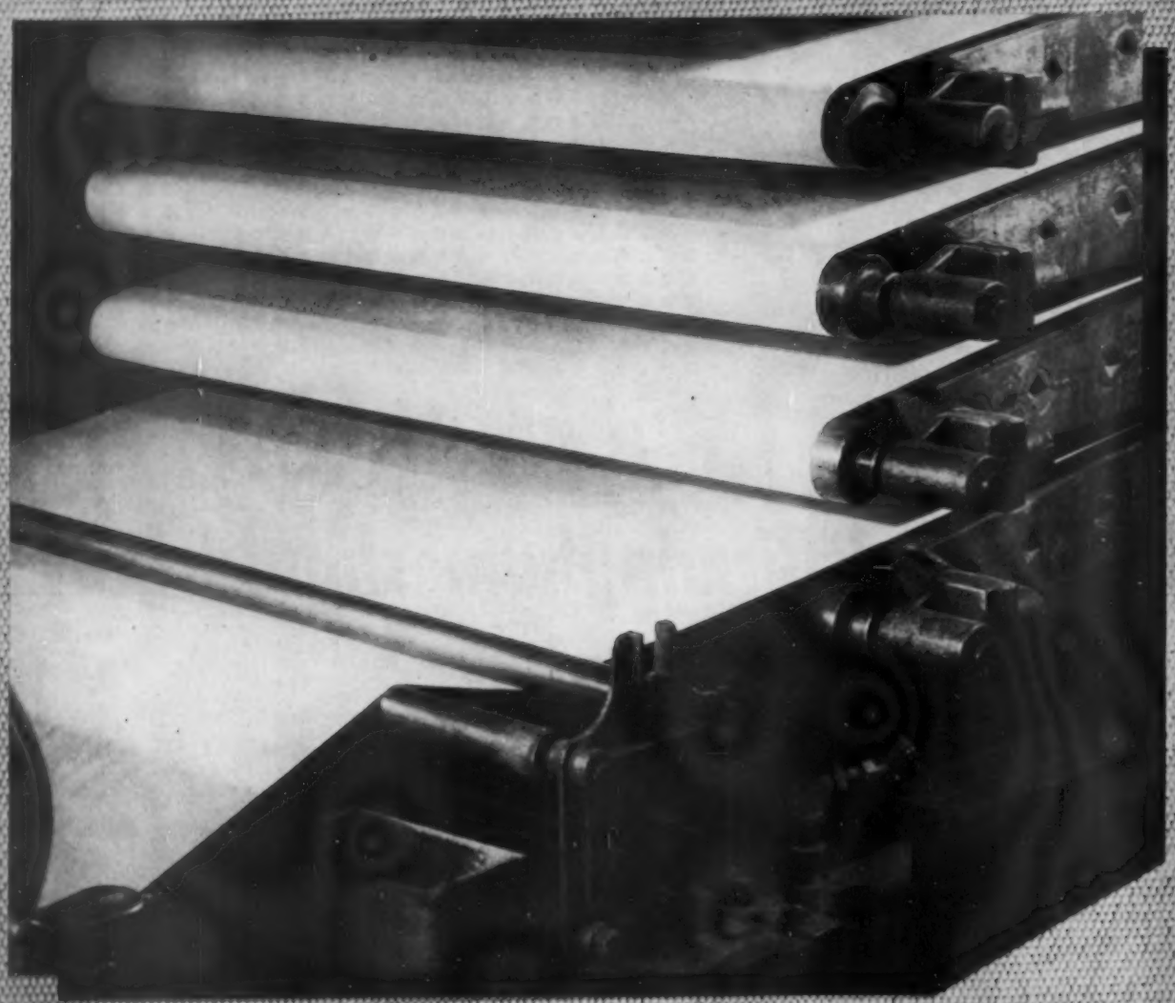

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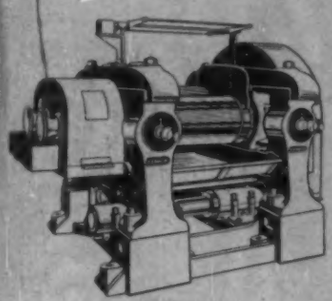

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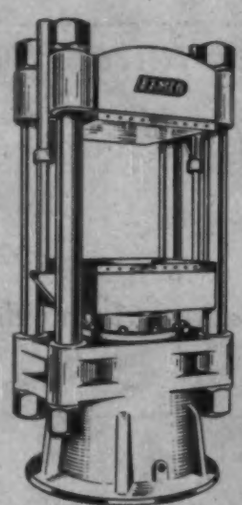

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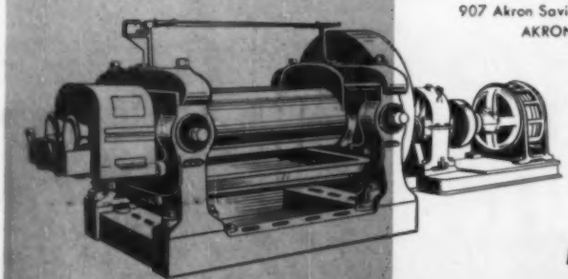

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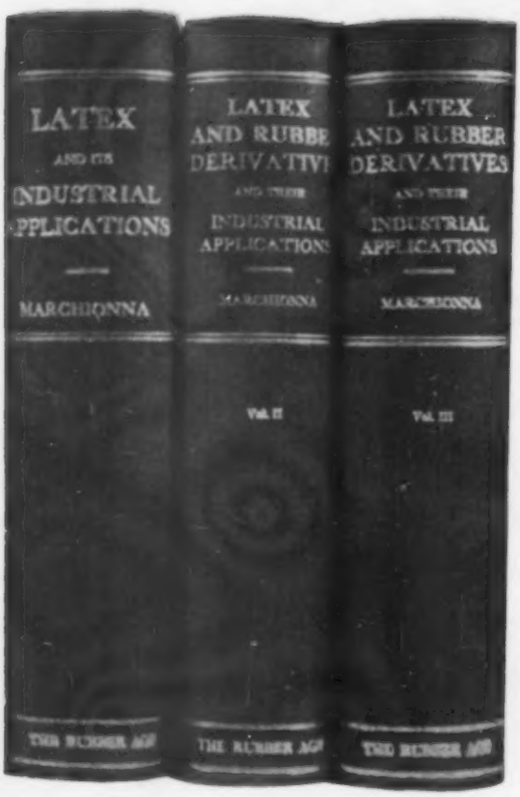

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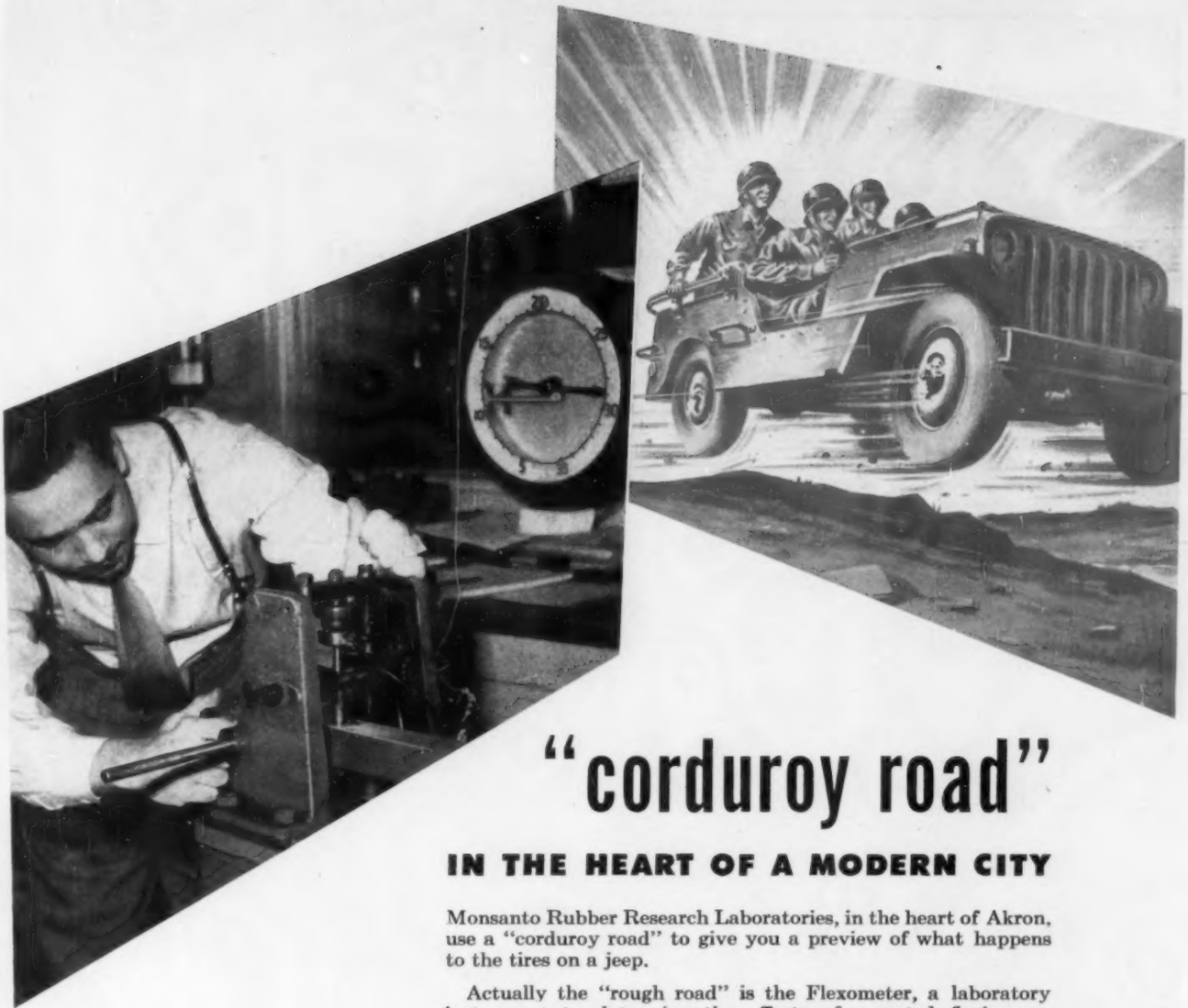

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IN THE HEART OF A MODERN CITY

Monsanto Rubber Research Laboratories, in the heart of Akron, use a "corduroy road" to give you a preview of what happens to the tires on a jeep.

Actually the "rough road" is the Flexometer, a laboratory instrument to determine the effects of repeated flexing on various rubber compounds.

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Many a mile of road testing has been saved by compounding corrections that have resulted from data developed on the Flexometer.

Monsanto Laboratories, staffed by capable technicians, have been serving the rubber industry for a quarter of a century. You may use these facilities for research in developments for your war production, without cost or obligation, either as a double check on laboratory work or to carry out original experimentation. For further information, please contact MONSANTO CHEMICAL COMPANY, Rubber Service Department, Second National Building, Akron, Ohio, or the Monsanto offices in St. Louis, New York, Chicago, Boston, Detroit, Charlotte, Birmingham, Los Angeles, San Francisco, Seattle, Montreal, Toronto.

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OKAY! Maybe the pessimists are right. We'll have another depression.

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4 THINGS TO DO to keep prices down and help avoid another depression

1. Buy only what you really need.

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3. Keep your *own* prices down. Don't take advantage of war conditions to ask more for your labor, your services, or the goods you sell.

4. *Save.* Buy and hold all the War Bonds you can afford—to help pay for the war and insure your future. Keep up your insurance.

A United States War message prepared by the War Advertising Council, approved by the Office of War Information, and contributed by this magazine in cooperation with the Magazine Publishers of America.

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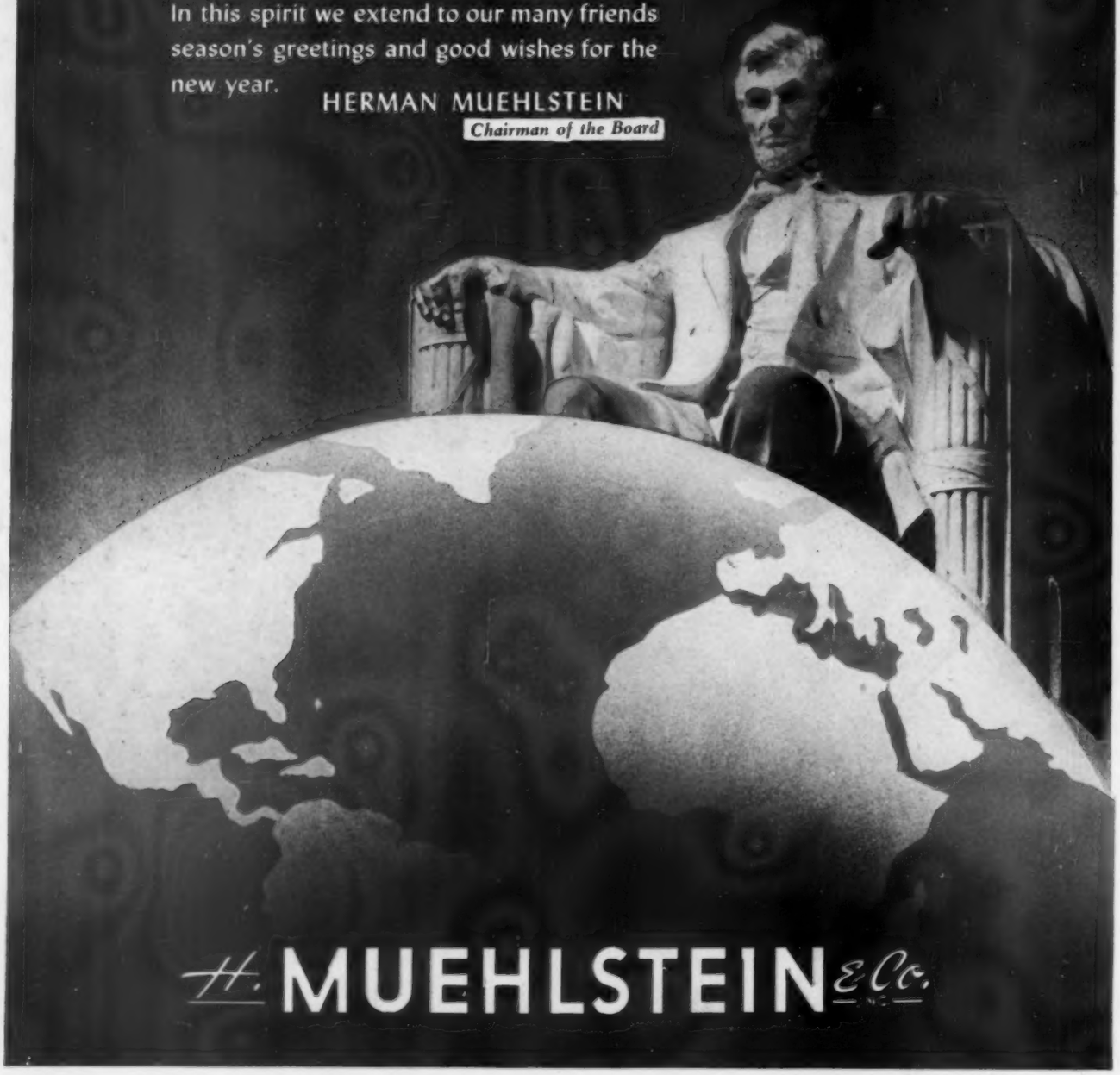
Chairman of the Board



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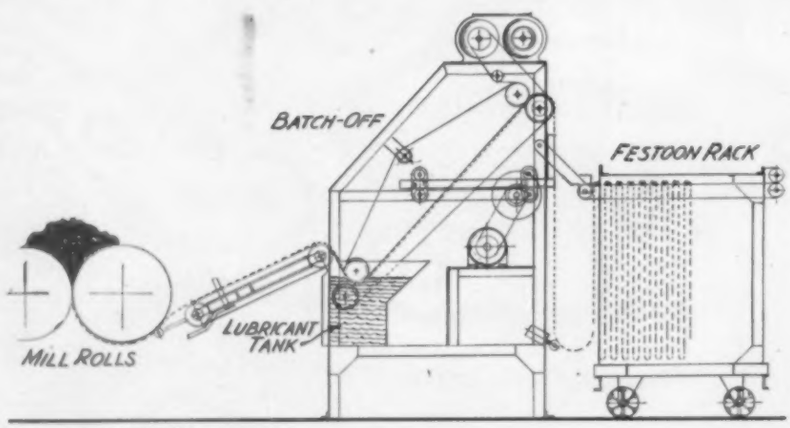

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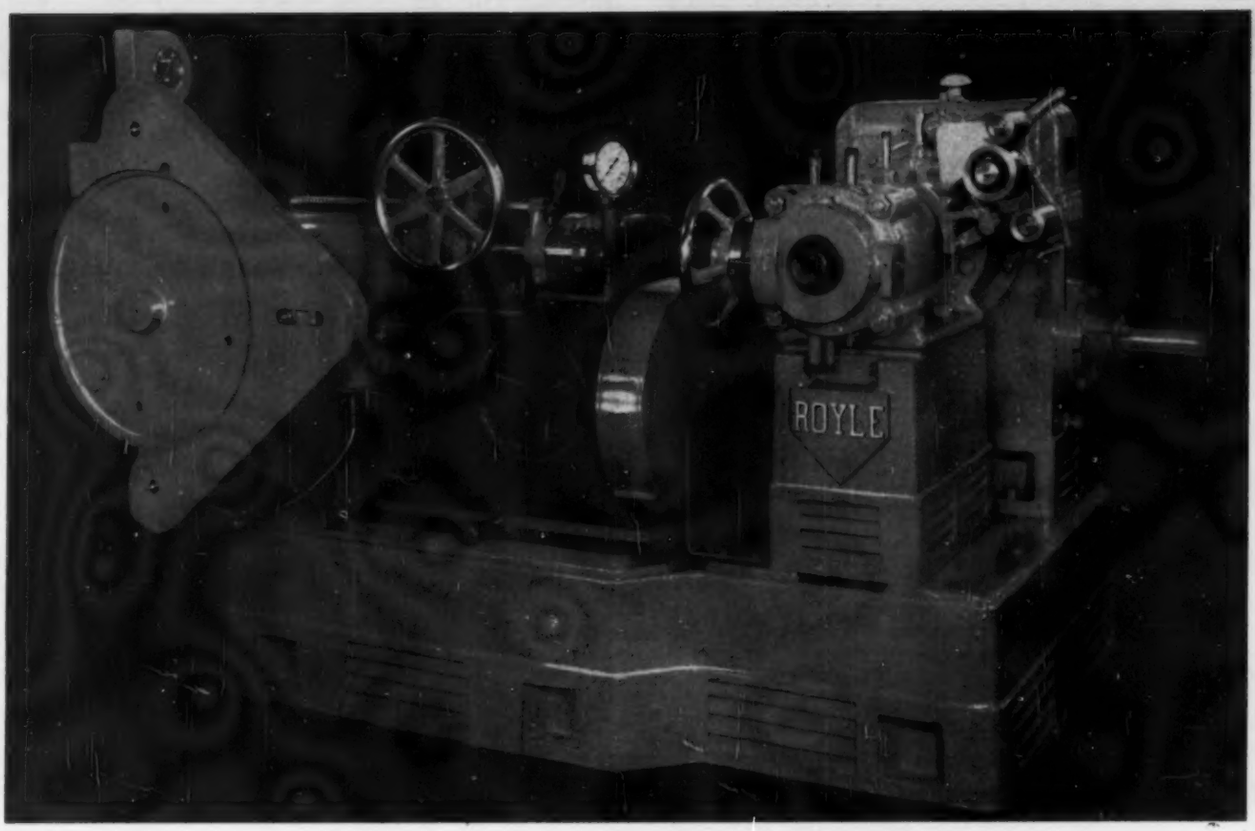

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The RUBBER AGE

VOL. 56, No. 4 JANUARY, 1945

Sealing and Seal-Aging Properties of Rubber Gaskets

An Account of an Investigation of Medium Soft Natural and Synthetic Rubber Gaskets for Various Types of Closures

By T. A. WERKENTHIN[a], A. D. SWENSON[b], C. K. CHATTEN[c], and R. E. MORRIS[d]

THE development of anti-oxidants, accelerators and other specialized rubber compounding ingredients enabled the manufacturers to produce in 1930-31 satisfactory medium soft rubber gaskets which were vastly superior to the hard gaskets previously used for watertight and airtight doors and hatches of Naval vessels. In order to evaluate the relative sealing properties of these new gaskets in comparison to gaskets previously available, it was found desirable to develop a test procedure. Wiley of the Navy Department, Bureau of Construction and Repair, described the first sealing apparatus which was developed at the Material Laboratory, Navy Yard, New York, by John Lind and his associates. Wiley described in detail the procedure used in evaluating the sealing properties of these gaskets *(1)*.

A deflection tester used in conjunction with this apparatus is shown in Fig. 1. This apparatus was used to determine the force to indent a bar of one-fourth inch square section into a specimen of rubber one-half inch thick until the two plates between which the bar and the rubber were being compressed came flush with the face of the rubber. The bar was indented its full depth or one-half the thickness of the rubber. The specimens were usually left clamped for a month of

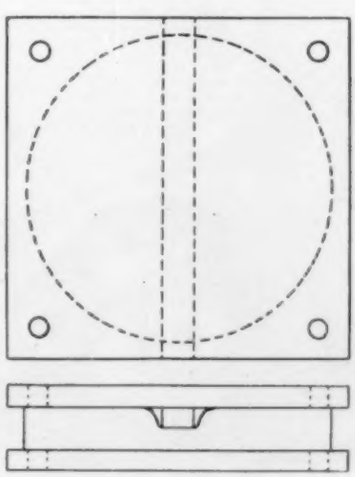

Fig. 1

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[b] Chemist, Chemistry Division, Naval Research Laboratory, Washington, D. C.
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[d] Senior Rubber Technologist, Rubber Laboratory, Navy Yard, Mare Island, Calif.

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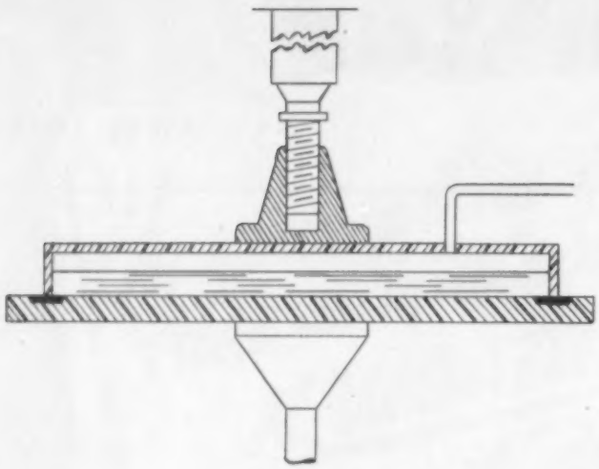

Fig. 2.

natural aging. For the rubber then used this force varied from 35 to 223 pounds before aging and dropped off to from 23 to 185 pounds after aging at room temperature for one month, the low values being for medium soft gasket stock and the high values being for the hard gaskets furnished in 1930 under Navy Department Specification 33R1.

A diagrammatic sketch of the sealing tester is shown in Fig. 2. This apparatus consisted of a plate having a hollowed out section in which the gasket rested on an inverted "knife edge" upper section which is similar in form to a heavy frying pan. The force, required to obtain sealing against a back pressure, was applied by means of a hydraulic jack.

It will be noted that while air pressure was used for back pressure, the sealing was against liquid, as a layer of water was put in the compartment and then air pressure was applied. This condition pertains to a large number of gaskets where it is desired to seal against water pressure. However, in airtight doors no resistance to water leakage will be necessary. Vapor and airtight gaskets for closures of all types require as low a pressure to deflect as possible, consistent with low compression set characteristics. Low modulus natural rubber compounds were developed which were found to be ideal for this purpose. This type of natural rubber gasket has been procured for a number of years under Navy Department Specification 33R4, subsequent improvements being made primarily in light and weather resistance. The sealing pressure was considered as a force in pounds per linear inch of knife edge calculated to pounds per square inch required to seal against a given back pressure of air tending to lift the knife edge away from the gasket.

After the superiority of the medium soft low modulus gasket had been demonstrated, it was found that the best grade of this type of gasket could be adequately described by specifying other physical characteristics, such as tensile strength, modulus, hardness, and air aging at elevated temperatures. The sealing test was therefore shelved, until in 1938 when one of the authors conceived the idea of developing an "all purpose" gasket which could be used in oil, as well as water or air, so that the number of types of spare gaskets carried in store in Yards or on board Naval vessels could be reduced.

The only material which could at that time be considered to meet these requirements was neoprene. Mr. V. A. Cosler and Dr. Felix Yerzley of E. I. du Pont de Nemours & Company collaborated with one of the authors in this attempt. They were furnished a copy of the Sketch of the Material Laboratory Seal-Aging Tester shown in Fig. 2, and Dr. Yerzley made a number of modifications in the apparatus which are indicated in Figs. 3 and 4, respectively. It will be noted that the essential features are retained. That is, the bottom-platen gasket holder and "knife edge" top section are similar to those shown in Fig. 2. However, the force is applied by means of a lever arm weighted down and the back pressure air to the top section was carefully controlled. The extent of the deflection was indicated by a dial type thickness gage. The apparatus was found to be satisfactory for evaluating the sealing properties. However, unfortunately, at that time the requirement of low modulus, low compression set together with suitable seal aging properties was not achieved using a synthetic oil resisting gasket.

A further advancement of the sealing apparatus is shown in Fig. 5. This modification was made at the

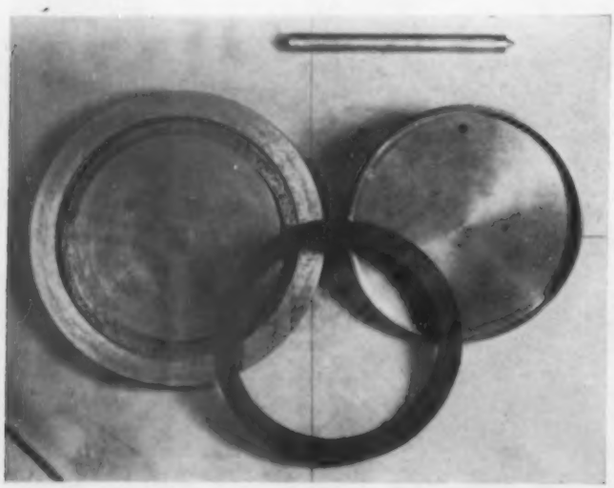

Fig. 3.

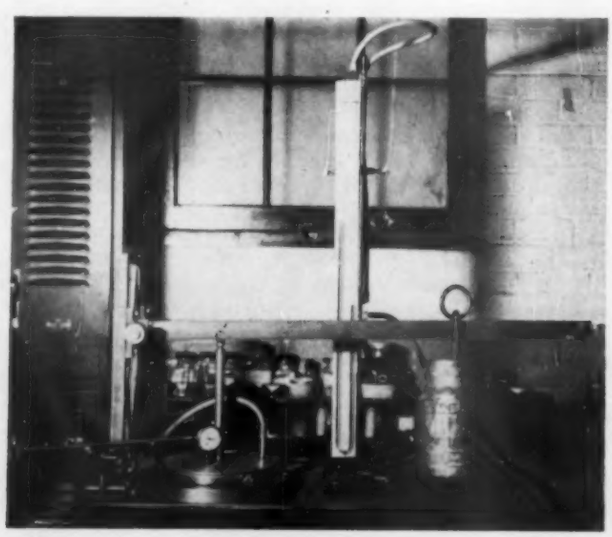

Fig. 4.

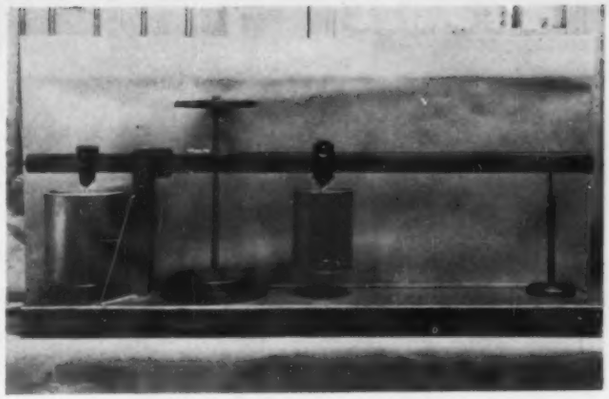

Fig. 5.

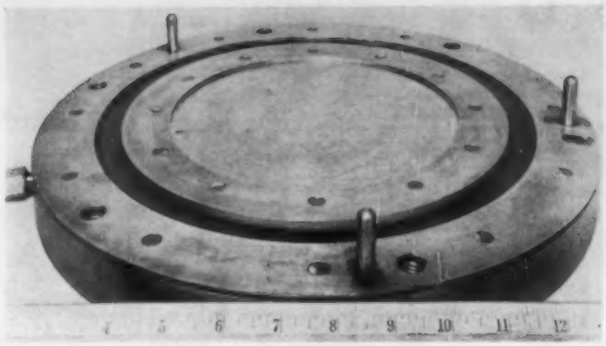

Fig. 6.

Rubber Laboratory, Navy Yard, Mare Island, and had the advantage of having a counter balance weight and an arrangement for lengthening or shortening the thimble through which the power was applied to the top platen. In this manner gaskets of different thicknesses could be used for testing. In addition, the weight was placed on a ratchet, facilitating accurate control and easy movement of the weight over the length of the lever bar. In addition to that, an adjustable stop was added which was put under the beam so that once the sealing pressure had been determined the force could be maintained without "follow up." In other words, it was desired to maintain the pressure uniform but not to permit the sealing edge to change its position as a consequence of the gasket taking on a permanent set. For some types of gaskets, this arrangement is not necessary. However, for gaskets used in watertight, airtight, and weather-tight closures there is no "follow up" in actual service and the position of the knife edge, with respect to the gasket channel, remains fixed.

The Engineering Index and the Industrial Art Index were searched from 1928 to date for prior work which had been done on sealing test methods or related tests on rubber and synthetic rubber. Kimmich *(2)* indicated that pieces of one rubber compound uniformly cured require the same unit load regardless of shape to give equal percentage deflection. This is important in seal testing because the results obtained in an apparatus using a certain deflecting head or knife edge would then be considered applicable to deflecting heads of a different size and shape so long as area relations are maintained. For example, in watertight and airtight doors, the so called "knife edge" usually consists of $\frac{3}{16}$ inch or $\frac{1}{4}$-inch plate having rounded-off edges. In gaskets for electrical junction boxes and similar type equipment a much thinner cross section plate is used and results obtained in one equipment may be used in the other.

There is a growing tendency of manufacturers of gasket material, Thorn *(3)* and *(6)*, to subject packings and gaskets to service tests rather than to the general physical tests, such as percent elongation, tensile strength, hardness, etc. For example, Thorn *(3)* gives illustrations and a detailed discussion of various service tests or simulated service tests of various types of packings and gaskets. A test which may in a sense be considered a sealing test was also described by Thorn *(4)* who, however, called it "compression and stress-decay in rubber gaskets." The equipment described is intended for gaskets used under loading varying from 1,000 to 9,000 pounds. It was found that when this same type of equipment was applied to low pressure medium soft gasket material the results did not come within the desired degree of accuracy.

Another type of equipment to test the holding properties of gaskets was described by Wertheim *(5)*. This apparatus is intended for flanged gaskets principally. Hopkins *(11)* described an apparatus measuring "relaxation of rubber-like materials" which offers promise of measuring qualities similar to sealing and seal-aging. The recovery force can be directly determined at any time and under the desired temperature conditions or after aging. However, this apparatus is not self-contained and a scale and Tinius Olsen Universal Tester or similar equipment is required to obtain the necessary readings. Only a limited number of manufacturers have all the necessary equipment for conducting this test.

An improved procedure for testing sealing properties of gaskets was developed by the Rubber Laboratory, Navy Yard, Mare Island, and is shown in Figs. 6, 7, and 8. This apparatus also uses a 10,000-pound Tinius Olsen Universal Tester for applying the necessary pressure. The procedure used may briefly be described as follows: The gasket is placed in the holder retaining ring shown in Fig. 6. The top of the gasket is lubricated with soap solution and the sealing plate is placed in position. The assembly is placed on the platform of a Tinius Olsen 10,000-pound Universal Tester, as shown in Fig. 7. The desired load is applied to the center of the sealing plate by means of the movable cross-head

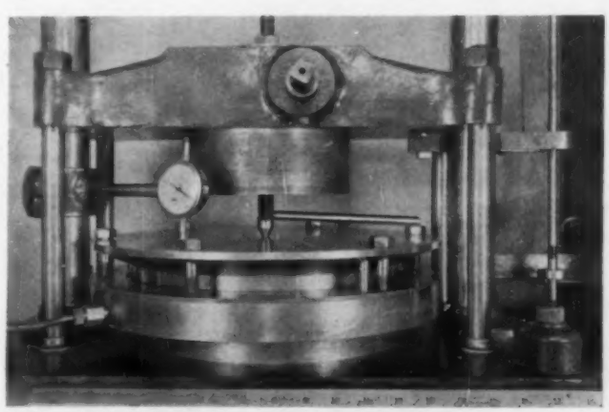

Fig. 7.

TABLE I—TYPICAL RESULTS OBTAINED FOR VARIOUS GASKET STOCKS

(In Relation to Other Physical Properties)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Specific Gravity		1.54	1.31			1.13			1.11	1.17	1.19				1.11		1.17		1.20		
Initial Physical Properties																					
Tensile strength PSI	1690	1490	2425	1110	1415	820	1880	1415	930	1570	1405	1560	2095	729	753	1620	1315	1875	1315	1795	1330
Elongation %	630	560	780	410	455	375	645	880	505	755	555	510	615	391	388	525	530	810	460	485	390
P and J hardness m.m.	1.62	1.64	1.68	1.95	1.76	1.52	1.52	2.01	1.66	1.95	1.56	1.75	1.73		1.76	1.55	1.56	1.78	1.44	1.35	1.49
Shore (30 sec.) points	42	40	39	34	37	40	40	32	40	34	40	39	38.5		37	41	41	36	44	46	43
Physical Properties After 48 Hours at 194°																					
Change in strength %	+9.8	+6.4	—7.7	+16.7	—21	—23.2	—2.1	+20.0	—4.8	—10.5	+8.2	+4.4	—6.9	—2.4	+42.1	+12.9	—6.8	+7.7	—1.9	—11.4	+16.5
Change in Elongation %	—34.9	—13.4	—11.5	—8.5	—15.4	—36.0	—7.8	—22.1	43.6	—20.5	—21.6	—11.8	—8.9	—27.4	—12.1	—2.9	—34.9	—6.8		—25.8	None
Compression Set																					
Navy method (square)	44.1	22.3	25.6	26.8	17.7	—20.0	11.2	32.8	27.1	35.2	16.8	22.5	20.8		25.3	7.6	27.5	31.5	23.4	13.6	8.5
ASTM Method B (square)	83.4	59.9	70.2	63.8	40.8	59.5	24.2	87.1	65.2	72.4	47.5	51.4	52.3	59.5		16.4	71.6	87.2	63.7	48.8	27.6
ASTM Method B (round)	91.1	63.4	75.4	67.5	41.9	58.1	25.0	86.7	64.7	75.1	44.7	53.8	55.8			21.5	72.6	87.3	60.5	50.3	28.3
Flexibility at 20°, gms.																					
Room 1-inch deflection	¼" 13					⅛" 10			¼" 7	¼" 9	¼" 10	¼" 9	¼" 9				¼" 8		"¼ 9	¼" 8	¼" 8
	½" 64	12	10	29	29	½" 35	34	33	½" 32	½" 40	½" 37	½" 33	½" 39		37	37	½" 35	32	½" 45	½" 29	½" 33
—20° F. 1-inch deflection	¼" 22					¼" 12			¼" 10	¼" 15	¼" 13	¼" 13	¼" 13				¼" 12		¼" 15	¼" 11	¼" 10
	½"117	18	12	40	39	½" 34	54	57	½" 42	½" 60	½" 47	½" 41	½" 54		45	58	½" 44	39	½" 68	½" 36	½" 48
Room 2-inch deflection	¼" 17					¼" 12			¼" 10	¼" 15	¼" 13	¼" 14	¼" 13				¼" 13		¼" 13	¼" 9	¼" 9
	½" 85	17	14	38	43	½" 50	47	46	½" 45	½" 59	½" 52	½" 44	½" 47		48	55	½" 47	44	½" 62	½" 42	½" 50
—20° F. 2-inch deflection	¼" 33					¼" 18			¼" 13	⅜" 21	¼" 16	¼" 18	¼" 17				¼" 16		¼" 19	¼" 16	¼" 15
	½"210	24	16	56	64	½" 57	83	81	½" 59	½"104	½" 71	½" 63	½" 76		65	89	½" 68	53	½" 98	½" 59	½" 74
Swelling in H_2O %	1.1	0.5	2.7	0.4	0.4	1.2	1.4	1.2	2.4	0.7		2.73	2.1		0.3	—0.3	1.6	3.0	1.4	1.3	2.4
Physical Properties After Light Aging																					
Change in strength %	+13.6	+5.6	—6.2	+3.6	—8.8	—7.9	—23.9	+14.8	+7.0	—21.0	—11.7	—22.1	—6.2	—0.8	—8.2	—15.1	—41.7	—1.3	—18.2	—20.1	—13.5
Change in elongation %	—34.9	—10.6	—10.3	—20.7	—19.8	—26.7	—20.9	—22.1	—41.6	—24.5	—41.4	—25.9	—10.6	—7.4	—23.5	—20.0	—51.8	—11.1	—33.7	—25.8	—11.5
Delamination	None	None	None	None	None	None	None	None	None	None		None				None	None	None	None	None	None
Seal Aging																					
Force for 1/32 indentation pounds	11.1	7.0	6.5	5.6	6.3	7.0	8.9	6.2	6.7	8.5	8.9	6.8	7.8	6.7	7.9	8.7	8.4	6.7	9.4	9.9	9.0
Initial seal PSI	72.0	Over 90	Over 90	82	Over 90	67	Over 90	85	90	78.0	Over 90	Over 90	Over 90	66.5	80.5	Over 90	Over 90	Over 80	Over 90	Over 90	Over 90
Aged seal 48 hours at 158° PSI	12.0	64	60	58	65	55	69	56	46	40.0	65	72	88	57.5	62	48	78	48	86	Over 90	Over 90

Note: Material and workmanship was satisfactory on all gasket stocks on which the above table is based, with the exception of Stock Nos. 14 and 15.

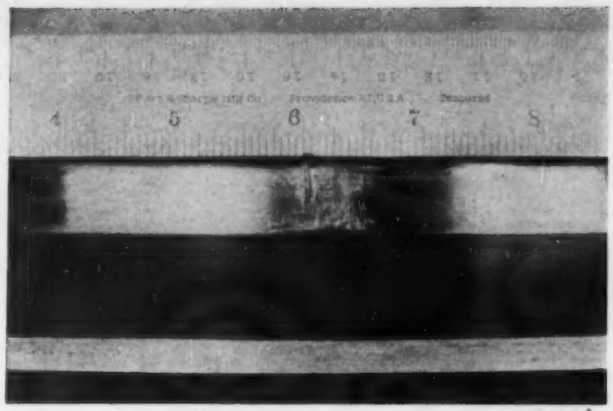

Fig. 8.

of the tester. The sealing plate is heavily constructed so that it will not flex to a significant extent under the load. When the desired load is reached, the downward movement of the cross-head is stopped. The bolts at the circumference of the sealing plate are run down so that their heads barely contact the upper surface of the sealing plate. Considerable care must be exercised so that the bolts are tightened uniformly.

The connection for internal air pressure is made immediately and the pressure in the enclosure beneath the sealing plate is gradually raised. The observation of the leakage which occurs at the shim is facilitated by the presence of soapy water. If leakage occurs at less than 150 p.s.i., the load per linear inch of sealing edge is increased in the next test. This procedure is continued until a seal is effected at 150 pounds air pressure.

One of the objections of the equipment was that it required an expensive apparatus such as the Tinius Olsen tester to produce the desired degree of deflection. The test was fairly satisfactory for approval and for testing in developmental work, but was not suitable for inspection testing. The use of the shim shown in Fig. 8 was later replaced by the use of a notch shown in Figs. 9 and 10, respectively. The purpose of the shim or notch was to evaluate gaskets which could seal satisfactorily even if the knife edge had become worn, distorted, or damaged. Tests of the sealing and aging quality of the gaskets were previously determined by placing the gasket in its original condition in the sealing tester. The gasket was then taken out of the sealing tester, aged in the Geer oven, and replaced to determine sealing quality after aging.

However, it was recognized that this did not simulate the condition of actual service. Therefore, a modification was made in the set-up so that after the gasket had been introduced into the assembly of the bottom platen, the top plate was bolted securely after the desired degree of deflection was obtained. The assembly is shown in Fig. 11. The test was further modified by using a constant deflection of ¼ inch instead of constant back pressure under which the gasket being tested would seal.

Except for the beam-loaded type of seal tester, the various apparatus described all utilize outside sources of obtaining the force required to obtain the desired degree of deflection. In order to make the equipment applicable to testing by a number of laboratories, and particularly make it suitable for inspection work, it

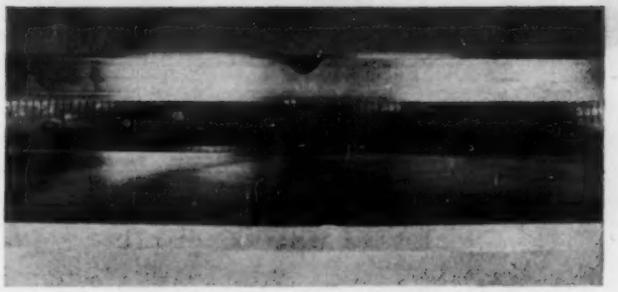

Fig. 9.

was necessary to use a self-contained apparatus. One of the authors working at the Material Laboratory designed an apparatus which has been designated the "Referee" method of seal aging. This apparatus and method of test are described briefly in Bureau of Ships Specification 33R9 *(7)*. It consists essentially of an air chamber two and three-eighth inches in diameter with a sealing edge one-eighth inch thick having a one-sixteenth inch radius. The apparatus further consists of a cap to contain a gasket specimen ½-inch thick by 4 inches in diameter. The air chamber is mounted on a base plate and is provided with upright supports for mounting a loading head. The cap is fitted with a bezel ring for retaining the gasket specimen. A dial gage for measuring indentation of the sealing edge into the gasket specimen is attached to one of the upright supports. The essential parts of the apparatus are shown in Fig. 12.

Two separate determinations are made. Indentation force required is the load per linear inch of sealing edge required to impress the sealing edge of the tester into the gasket specimen a measured distance, for example, one thirty-second of an inch. The cap is centered over the sealing edge and three thumb screws in the load head are adjusted to make light contact with the cap. The load is applied directly to the spindle of the loading head after the collar and the hand wheel of the tester have been removed. Another method of determining the force required to cause indentation of a certain degree is shown in Fig. 14. This apparatus utilizes the beam sealing tester shown in Fig. 5. Results obtained by the previously described method and this method agreed closely.

After making the deflection tests, the collar and hand wheel are replaced on the tester for making the seal-aging test proper. The three thumb screws are again adjusted to make light contact with the knife edge of the cap. The hand wheel is turned to impress the sealing edge into the specimen ¼ or 1/32 inch as desired. The air chamber of the tester is connected to a compressed air line through a pressure regulator valve. A gage shows the air pressure in the chamber; the release valve serves to vent the air after the test.

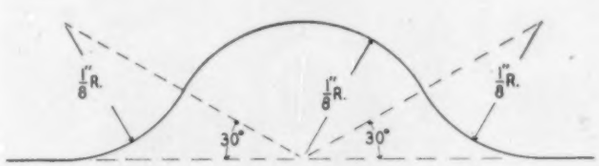

***Fig. 10—Detail** of notch in sealing edge of gasket testing apparatus.*

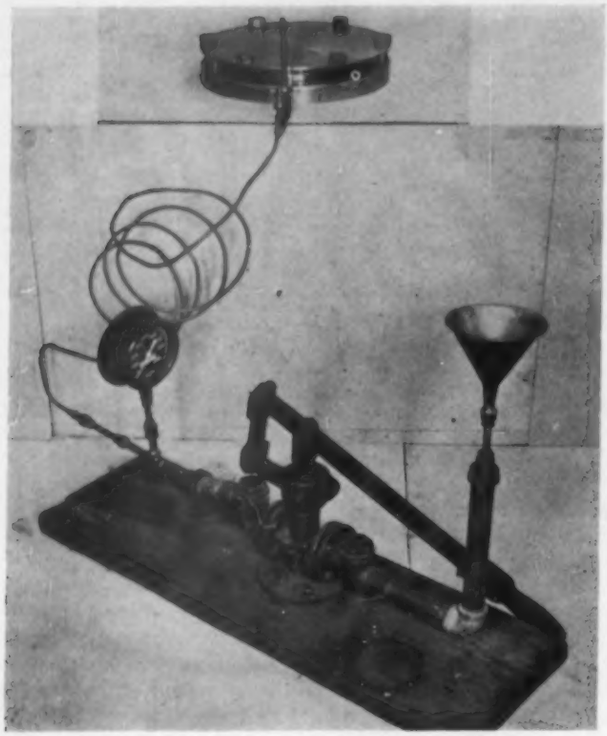

Fig. 11.

In making a test, the apparatus is placed in a pan of water and the water level is adjusted above the lower edge of the cap. The sealing pressure is determined roughly by increasing the air pressure until leakage occurs, as indicated by escaping bubbles. After venting the chamber, air pressure is again raised to determine the sealing pressure which the gasket can hold under the given deflection. Inspection of the gasket during application of the air pressure is facilitated by placing a mirror, face up, near the place of leakage.

The end point of the sealing test, that is, the highest sealing pressure, is evidenced by no apparent movement after two minutes of an air bubble over the under edge of the cap. After the initial sealing pressure has been determined the apparatus is removed from the water bath and disconnected from the air line without disturbing the setting of the hand wheel. The apparatus is then thoroughly dried and placed in a Geer oven and aged for 48 hours at 158°F. + or —2°F. For more severe conditions, higher temperatures and longer aging periods are used. After the oven aging, the apparatus is allowed to cool for three hours at room temperature. The sealing pressure, after aging of the gasket specimen, is determined in the same manner as that described above. The set-up for making the test is shown in Fig. 13.

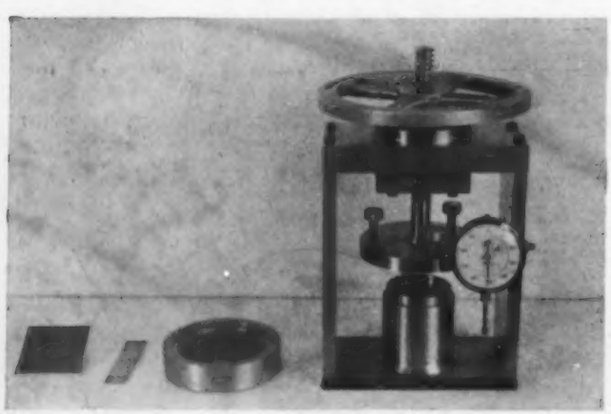

Fig. 12.

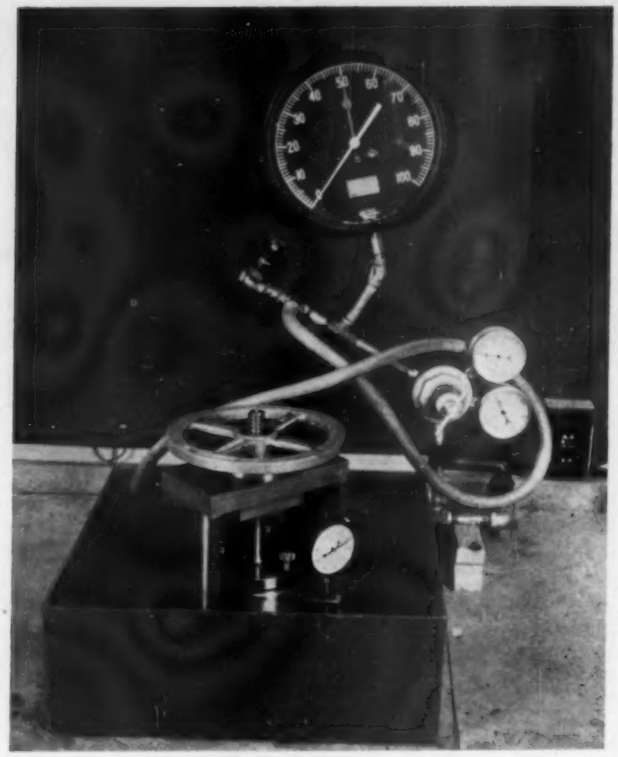

Fig. 13.

Typical results of seal-aging, together with other physical characteristics of gasket materials, are given in Table II. While the so called "referee" method uses an apparatus costing considerably less than the equipment previously described, it was desired to further simplify the apparatus in order that the test could be used for all inspection purposes.

One of the first approaches to the problem of simplification was an attempt to use standard equipment. For example, some work was done using the A.S.T.M. apparatus for determining compression set by Method A or Method B. The apparatus described in A.S.T.M. D-395-40T *(8)* was modified by placing a wedge in between the upper and lower platens of the device for compression set tests using a calibrated spring loading. A cup, having a knife edge similar to that used in the "referee" method, except smaller in size, was used to impinge on the gasket held in a small platen similar to that described in the "referee" method. Without the wedge to prevent follow-up, the "knife-edge" of the cup cut through the gasket just like a biscuit cutter.

After numerous experiments it was decided that the apparatus while giving rough indication of quality was not adapted to the intended purpose. When using the type B apparatus there was a slight amount of

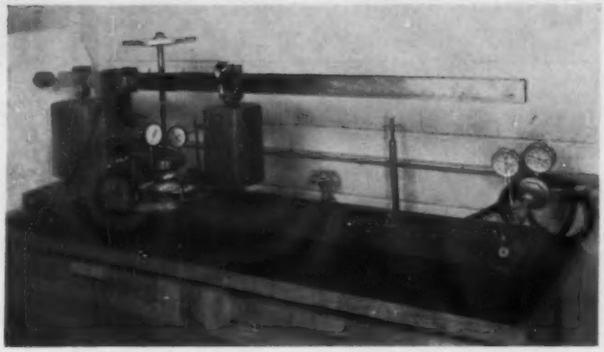

Fig. 14.

tilting of the cup edge on the gasket surface so that considerable amount of variation in the sealing pressure before, as well as after, aging was experienced. These attempts were therefore discontinued because the time used in levelling the plates was excessive.

In view of the urgent need for the rapid development of a test method suitable for inspection testing, due to fluctuation in availability of synthetic rubber, an additional investigation was carried out at the Naval Research Laboratory. Two testers were developed simultaneously. One of these testers was called Model 453-WBS. The details of this apparatus are shown in Figs. 15 to 18, inclusive.

The assembly of the seal-aging tester, Model 453-WBS, with rubber sample is shown in Fig. 17. The cast frame is held with the dial down. The piston is inserted into the slot with the open portion away from the dial end of the frame. The rubber sample is dropped into the open end of the frame, care being taken to see that it makes a sliding fit, not a tight or a loose fit, with the sides of the frame. Next, the sample holder disc is carefully dropped in on top of the rubber sample making sure the disc does not bind, but has a sliding fit over the rubber sample. The bottom plate is fixed in place by tightening the bottom plate screws and the adjusting screws tightened by thumb until the rubber is flat but not tight against the flange at the bottom of the slot. Care must be exercised to make sure that the rubber is not binding but is flat against the platen. The instrument is now up-ended, putting the dial on top, and the screw knob assembly screwed into the opening in the dial center just short of putting pressure on top of the piston. The instrument is now ready for testing the rubber sample.

In order to obtain an original dial reading, for the proper indentation of the rubber with the open end

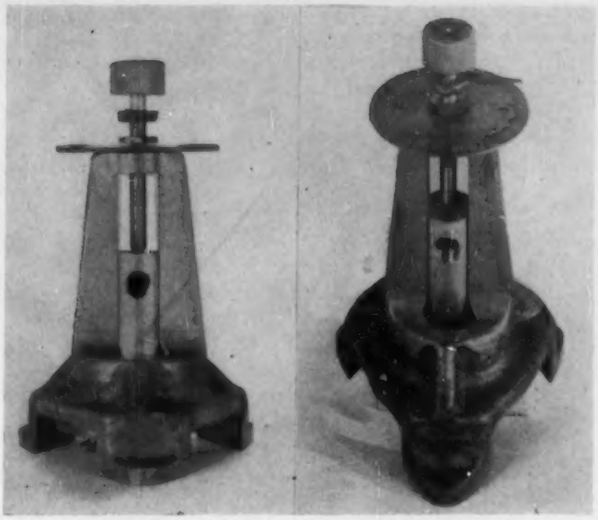

Fig. 15. *Fig. 16.*

of the piston, a ¼ inch pipe nipple is inserted and tightened into the piston through the frame slot and a rubber tube is attached to the outer end of the nipple. Water is dropped into the space on the rubber not covered by the open end of the piston. By blowing through the rubber tube and simultaneously adjusting the screw knob the original or zero reading on the dial can be taken. The adjustment which barely stops the air bubbles coming from the bottom of the piston is the original dial reading. The dial is then turned clockwise one revolution plus 6 units, or a total of 31 units, giving an indentation 1/32 of an inch of the piston or "knife edge" into the rubber sample. Other indentations may, of course, be used.

The lock nut is tightened on the top of the dial to secure the setting. The pipe nipple is screwed with the aid of a coupling to a system composed of a compressed air or nitrogen source containing a dial pressure gage and the necessary regulating valves. The air pressure is increased slowly on the dial pressure gage until bubbles come to the open end of the piston. The air pressure is slowly reduced until the bubbles cease.

By increasing and decreasing the air pressure several times, a reading can be taken which will represent the characteristic sealing point of the particular rubber sample at a particular deflection. The pressure at which the bubbling ceases is the sealing pressure of the rubber. The entire assembly is then placed in a Geer oven controlled at 158° F. + or —2° F. for a period of

TABLE II—COMPARISON OF TEST RESULTS

Operator	I GR-S		II Neoprene		III Natural		IV Natural	
	BA	AA	BA	AA	BA	AA	BA	AA
A	55	20	85	48	77	66	69	42
B	54	5	86	58	79	65	70	44
C	51	14	81	49	77	68	66	38
D	51	14	86	38	83	72	71	44
E	54	..	90	54	77	68	71	45
F *	53.5	13.5	..	..	66	58	79	58

* "Referee Method." BA = Before Aging; AA = After Aging.

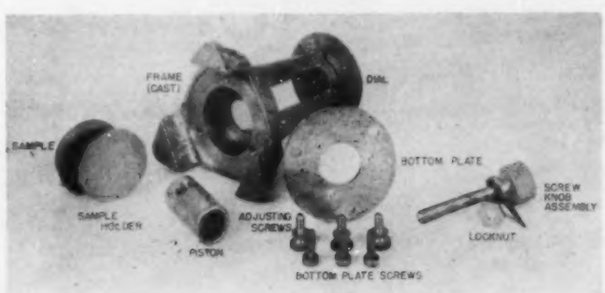

Fig. 17.

48 hours. Other temperatures and lengths of aging are used for special applications. After cooling for three hours the pressure sealing test is repeated, using the same method as described above.

As will be seen, this method embodies a number of the features of the "referee" method previously described, except that the entire apparatus has been inverted in order that the air bubbles may be seen without the aid of a mirror. A uniform adjustment of the piston against the rubber sample is obtained in a manner similar to that obtained in the "referee" method, namely by thumb screws. In March, 1944, one of the authors presented a preliminary discussion *(10)* of the subject matter at a meeting of the A.S.T.M. particularly of the apparatus now to be described.

All of the previously described seal-aging instruments employ the same underlying principle in their operation, namely that of measuring the pressure required to force air through a junction between the rubber under examination and a metal bead or "knife edge" similar to that on the actual doors and hatches. The requirements for such an apparatus are, first, the sealing edge which will indent into the rubber to make a seal; second, an accurate gage for measuring the distance which the sealing edge has been indented into the rubber; third, a pressure chamber which is sealed by the above-mentioned sealing edge indented into the gasket and into which compressed air can be applied until leakage occurs. This arrangement is common to the instruments previously described and measures the sealing qualities of rubber in absolute terms. The ease and convenience of the actual accomplishment of these measurements is purely a problem of instrument design.

The "referee" instrument is capable of accurate and reproducible results, but its manipulation is not feasible to unskilled operators. Furthermore, for employment in routine inspection, the instrument is too expensive and too large, requiring excessive oven space, all of which makes its use prohibitive for most of the smaller manufacturers and consumers.

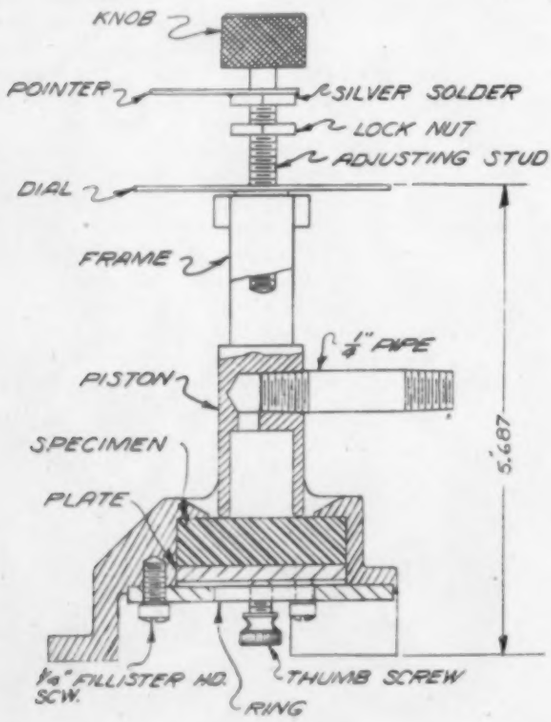

Fig. 18.

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(To Be Concluded)

Letter to the Editor

Dear Sir:

Your publisher in 1925 attended in Boston the 100th Anniversary of the American Rubber Industry, Dec. 7, 1925 in the large (capacity 700) dining room of the then new Boston Chamber of Commerce.

I am writing today the U. S. Rubber Co. (adv. dept.) that their concern is quite modest in claiming to be 102 years old (in 1944) when they are really 120 years old (in 1945). It was Thomas Crane Wales, a brainy Boston merchant, who conceived the idea of sending wooden lasts to Para to overcome the poor fitting smoked rubber shoes coming from the Amazon Valley to Boston and Salem. This was in 1825.

Furthermore, these smoked "cured" rubber shoes were very popular from 1825 to 1843 inclusive. This rubber, not being broken down on a hot mill or in a solvent, did not spoil and in some instances kept for 50 years or so (if not used—even without sulfur and heat).

After vulcanization was fully demonstrated, this same Thos. C. Wales invented the buckle overshoe known for half a century as the "Arctic" (having waterproof cloth tops and more recently zipper fastenings to take place of buckles), hence the Wales-Goodyear Rubber Shoe Co., absorbed by the U. S. Rubber Co. long ago.

Incidentally the oldest rubber manufacturing company —the Boston Belting Co. (which succeeded in the same location the Roxbury India Rubber Co.)—was liquidated about 1925.

Yours truly,
QUINCY TUCKER

St. Petersburg, Fla.
121 - 13th Ave. North
Dec. 29, 1944

The Use and Evaluation of Some Specialty Adhesives

By FRED J. WEHMER

Technical Director,
Adhesive & Coatings Div.,
Minnesota Mining & Mfg. Co.,
St. Paul, Minnesota

THE art of making and using adhesives is a very old one and glue and starch products have been used since time immemorial. The first products used were animal or vegetable compounds. Recently many specialty adhesives have been developed, and in this article we will discuss the use and testing of a few of these adhesives.

The uses to which adhesives are put are almost beyond enumeration. The types of adhesives used are also very large, so we will not attempt to do more than touch on a few which are in use today. The war has put an emphasis on replacement materials and as a result many new resins and other materials are being used as adhesives. Due to the number of types of adhesives and the many uses to which they are put, no simple test yet devised seems to answer all requirements of a universal test for evaluating adhesives.

A consideration of the definition of "adhesive" and some thought as to the factors which go into the making up of an adhesive seem in order. No attempt to give any theory explaining adhesion will be made. Our definition of an adhesive is as follows: An adhesive is a substance used in promoting and maintaining adhesion between two materials. In order to do this, the adhesive must adhere to both surfaces either through specific adhesion or by mechanical anchorage through entering voids, as in fabric or other porous material. The material must also have cohesion or the ability to hold together when placed under a strain. Thus, adhesion and cohesion are the same force, acting in the case of cohesion between adjacent parts of the same body while adhesion is a similar interaction between the closely continuous surfaces of adjacent bodies.

Note: This article is based on a paper delivered by the author at the Annual Meeting of the Rubber & Plastics Division of the American Society of Mechanical Engineers, held in New York, N. Y., on November 30, 1944.

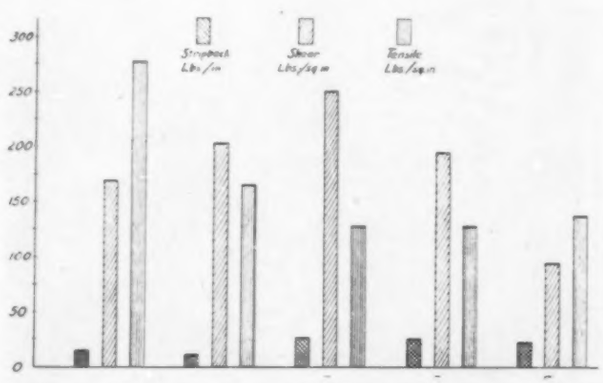


FIG. 1—Strength value of five cements.

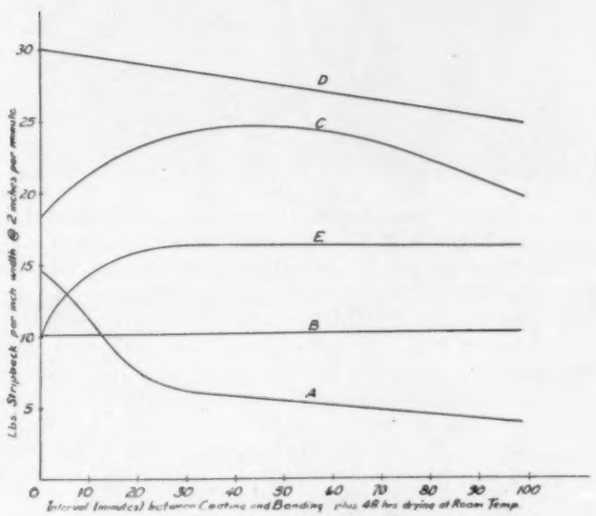


FIG. 2—Bonding Ranges.

Having established these relationships, there are only two ways in which force can be exerted on a bonded surface. The first and perhaps the one most often evaluated is in shear. The second is in direct tensile, as when two blocks are pulled apart. Naturally, when an adhesive is actually used, it may encounter either or any combination of the two. The combination is illustrated by the "peel back" or "strip down", as when a flexible material is stripped from a rigid base.

Five non-vulcanizing adhesives have been chosen to illustrate the methods of testing we should like to consider. In Fig. 1, values obtained by shear test, tensile test, and strip down test are compared. The values on the shear test are higher by far than those obtained by the strip down method. The tensile values are dependent on bonding at the correct time and may either be higher or lower than the shear values. These tests were made by coating the materials with three coats of

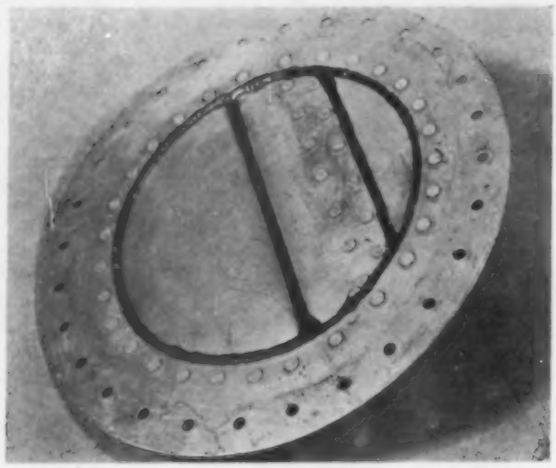


FIG. 3—Test panel simulating types of joints and edges to be sealed for pressurizing plane cabins. Dark portions indicate sealing compound.

adhesive and bonding after five minutes drying. The bonded samples were air dried for 48 hours and were then pulled in a Scott Tensile Tester at a rate of 2 inches per minute. Thus, these materials were all bonded at the same time, which obviously is not the best condition for all adhesives. The use to which an adhesive is put will determine the testing method.

The time at which an adhesive is bonded also has an influence on the strength of an adhesive. This is indicated in Fig. 2, which compares the five adhesives indicated in Fig. 1. In this test, the adhesives were compared by coating 1-inch strips of No. 10 duck with three coats of adhesive at 15-minute intervals. After the third coat of adhesive, the strips were bonded at 2, 5, 10, 20, 30, 60 and 90 minutes. The bonds were stripped down after 48 hours at room temperature in a Scott Tensile Tester at 2 inches per minute.

Adhesive A gives high values if bonded quickly; Adhesive B gives nearly the same value all along; Adhesive E reaches a maximum and then remains constant; Adhesive C reaches a maximum and then falls off, while D comes steadily downward. Examination of Fig. 2 shows that some adhesives have much better properties of welding to themselves than do others. It also shows that it is necessary to use an adhesive correctly to get the most value from the adhesive.

Strength tests by no means tell the whole story in the evaluation of adhesives, since the usage to which the adhesive will be put will determine the evaluation used, as, for instance, where an adhesive is put under constant strain of low intensity. Two adhesives each giving the same shear and strip down values may show one that is satisfactory under constant strain of low intensity while the other will fail. To determine this, we use a dead load test where a load below the failure value is placed on the assembled bond, and while one adhesive will support the weight, the second will gradually fail. A test of this type is described in Specification 26571 where a 1 square inch area must stand a dead load of 25 pounds at 115°F. The shear test is a minimum of 150 pounds and adhesives which will pass the shear test will often fail on the dead load test. Oftentimes a tensile or strip down test does not tell the whole story, since some adhesives show good values when a slow steady force is exerted, but they fail under a sudden quick pull. The conditions of use must also be evaluated since many adhesives may show excellent properties when tested at normal temperatures, but may fail at elevated temperatures or at very low temperatures.

We cannot overlook the permanency of the bond which we make, and this we try to cover by aging the assembly in the Geer oven, the oxygen bomb or the air bomb. When the conditions are such the the bond must withstand oils or solvents or water, it is well to make tests against these materials. This is usually done by immersing in the solvent against which the adhesive must be used.

We should not overlook the specification tests which are used to assure maintenance of quality. These are usually routine tests, such as: solids content, to assure that the adhesive is properly formulated; viscosity, to assure that the material will work properly; stability in the container, usually by aging at elevated temperatures in the container; strength tests, to assure uniformity of results. These tests are usually run on each lot of adhesive made, in order to make sure material of the correct grade is being sent to the customer.

The testing of adhesives is of a great amount of interest. This is shown by the fact that a Standing Committee has been formed by the American Society for Testing Materials to set up standard tests for the testing of adhesives. This is a step in the right direction since today everyone in the industry is testing according to their own notions. This Committee is actively engaged in writing methods and when these are written they will give everyone a standard method to use.

All the tests discussed above are laboratory evaluations. It seems that though we may measure the strength, stability, and aging, there is still only one real way to find out if an adhesive has merit. That is to try it out on the structure in which it is to be used. Many times, of course, this is not possible. At such times the results obtained by laboratory testing can be compared with results from known compounds and by using good judgment; only those materials with real merit will be evaluated on the job. The conditions under which an adhesive will be used will influence its testing. If it is to be used at low temperatures, this condition should be emphasized in the testing. If the conditions are to be those of high heat, that will have to be taken into consideration.

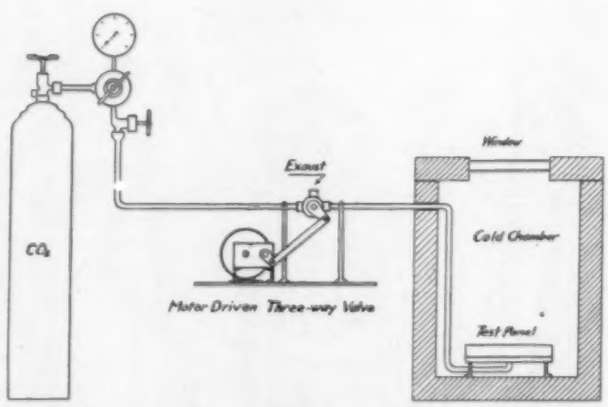


FIG. 4—Schematic drawing of cabin sealer test equipment.

To illustrate how we sometimes build special apparatus to evaluate an adhesive for a special job, the apparatus used in the development of a sealer for pressurizing the cabin of planes will be described. The adhesive was of a type which had to bridge a gap and prevent the flow of air through seams in the metal structure. It had to withstand conditions encountered when the plane was on the ground as well as the very low temperatures of high altitudes.

To obtain seams similar to those used in a cabin, a test plate or panel was made which simulated the types of joints and faying edges to be sealed. This panel, illustrated in Fig. 3, was small enough to allow easy handling and yet was flexible enough to simulate conditions on an actual plane. The panel was then sealed on the pressure side (as indicated by the dark portions in the illustration) and the compound used was given an opportunity to dry and reach its maximum strength.

The panel was then fastened into a flex testing fixture (seen resting in the cold chest in Fig. 5), and was pressure tested at room temperature with a pressure of 15 pounds per square inch. The fixture was then installed in a cold box and pulsated at the rate of 35 pulsations per minute, as illustrated in the schematic drawing, Fig. 4. This pressure provided a movement of approximately 1/16 inch at the center seam of the panel. The test panel was covered, opposite the pressure side, with a low boiling naphtha for low temperature tests and water for heat tests. The temperature of the panel was checked by a thermometer immersed in the liquid. The whole unit could be observed through the glass door in the unit. The test jig mounted in the cold chest is shown in Fig. 5 and the complete assembly is shown in Fig. 6.

Materials to be tested were pulsated and the temperature was reduced. The materials were run until failure occurred as evidenced by bubbles in the liquid which was used. For materials which did not fail at —95°F. the panel was aged for 7 days at 170°F. and then the pulsation test was repeated to —95°F. By this means, it was possible to evaluate the materials at conditions which approached service conditions.

It should be pointed out that strength tests were run in conjunction with this special evaluation. Tests of this nature must be comparative and are really not of much value unless you have a standard material with which to make a comparison. If under the same conditions it is possible to make one material fail while a second does not, the material which does not fail will also be best in actual service, unless the conditions of testing were poorly chosen.

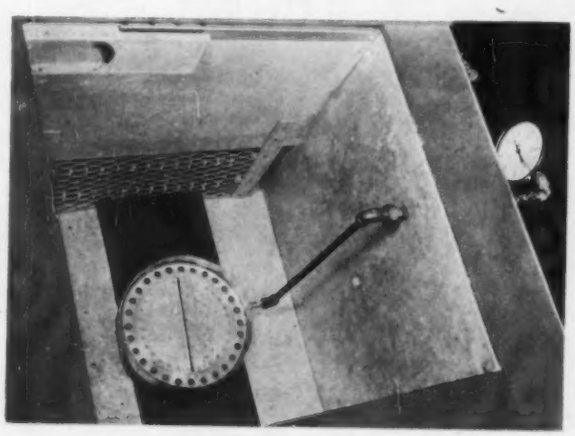


FIG. 5—Test jig mounted in cold chest.

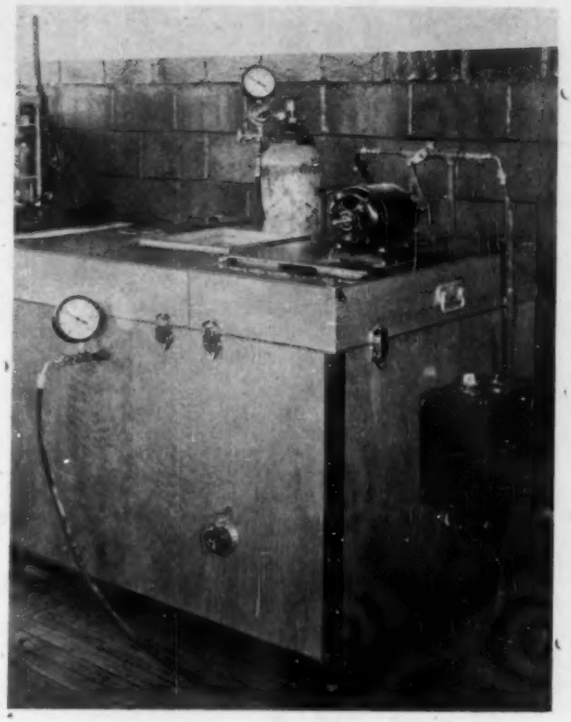


FIG. 6—Complete assembly used for test.

Mention will be made of a few specialty uses of adhesives. One method of using adhesives consists of coating them on films such as papers, and we have our tapes. The adhesive may then be such that adhesion is obtained by merely pressing the tape in place or the adhesive may be activated by a solvent or the application of heat. These adhesive tapes find application for many purposes, such as sealing cartons, surgical tape which is used with dressings on wounds, and the transparent tapes used for mending books and closing packages. These tapes are unique in that the adhesive is ready for use without the necessity of waiting for the solvent to dry and for many specialty purposes provide an ideal way to make use of adhesives.

A large adhesive field and one which is growing is the field of structural adhesives. These may vary from the vulcanizing adhesives used to fasten rubber and synthetic rubbers to metal, to adhesives for plywood and adhesives such as Cycleweld for the lamination of metal parts. This field is being exploited very vigorously at the present, and developments in this field will be many and outstanding.

Another type of material which has very unique properties is that made from latex or water dispersed resins. Included in this group are the water dispersed reclaims and the glues and starches. They offer the advantage of a non-toxic solvent along with the fact that there is no fire hazard connected with their use. Materials of this type find a large usage in combining paper and cloth, and crude and synthetic rubber latex give unique films in that they are flexible over a wide range of conditions and possess quite a bit of elongation.

Resin-synthetic rubber combinations have been used for some unique installations. On aircraft and ships it is necessary to provide a surface on which the personnel can walk without danger of slipping. This was accomplished by the application of a lightweight deck covering which was adhered by means of an adhesive. This adhesive must have good application characteristics plus the ability to withstand water and it must be able to withstand the low temperatures of high altitudes and also the high temperatures of tropic climates.

Adhesives are also finding use in the application of coatings for the lining of chemical equipment. Through the use of adhesives in combination with compounds designed for application over these adhesives, it is now possible to line tanks in the field. This method has certain advantages over the fabrication of complete structures in a factory, since it is possible to line rather large structures.

In conclusion, it seems quite evident that with the large number of adhesives and the many adhesive uses, a simple test to evaluate adhesives will not be forthcoming. Standard methods of testing are, however, as previously mentioned, being prepared by Committee 14 of A.S.T.M. Best methods of evaluation are those which most closely approximate the actual conditions under which the adhesive will be used. There are many uses for which adhesives can be used and the adhesive industry will keep growing since with many of the specialty adhesives we have only scratched the surface as far as uses are concerned.

ACKNOWLEDGMENT

This paper would not have been possible without the cooperation of the R. T. Vanderbilt Corporation, the Chrysler Corporation, and the Firestone Rubber and Latex Products Company, and the author thanks them for their help and suggestions.

Report of an Industrial Accident

IT is often said in a joking way that ignorance is bliss; however, in this case it was a tragedy. The accident occurred on a small 3-roll rubber calender machine. On the safety engineer's recommendation this calender was equipped with what the safety engineer and the management thought was a fool-proof safety device. Under ordinary conditions it was above average for safety and is in vogue on many up-to-date calender machines. The calender rolls were only about 24 inches wide and directly in front of the operator. At each side of the machine frames were two long vertical rods connected with a solenoid electric brake and the slightest touch of either rod would stop the machine almost instantly should a person get caught in the rolls.

The operator was an old timer on the job and knew all about the safety device and had great faith in it; he also had the habit of occasionally tripping the safety and it responded instantly to his satisfaction. This calender operator had a young boy about 18 years old who was his helper. The helper had nothing to do with the calender machine and his job was to haul the finished rubber away in a hand truck and get new raw rubber for the rolls. The boy knew nothing about operating the machine and knew less about the safety device, although he had watched the man operate the machine and no doubt had said to himself that he could do the job too.

One day the calender operator left his machine to go to the wash room. He left the machine running and while he was gone the boy thought he would run some rubber through the rolls. An experienced calender operator never places material into rolls with his fingers leading, but doubles up his fist and pushes the rubber into rolls safely, as in this manner the rolls cannot catch the fingers. The boy, however, placed the rubber into the rolls with his fingers leading, and they were caught in the rolls and his hand crushed half way up to the elbow before a fellow worker "kicked" the safety rod. After the amputation of the whole hand the boy admitted he knew nothing about any safety device which would have prevented this tragedy.

Even helpers should be given safety instruction and shown how to use the available safety devices. New employees must be sufficiently impressed with the safety rules so that they do not disobey them.

National Safety News

Furfural Adhesives as Bonding Agents for Rubber Products

A NUMBER of useful adhesive products prepared from furfural resins have been developed at the Plastics Industrial Technical Institute in Los Angeles, Calif. These have exhibited excellent bonding properties for various plastics and vulcanizable rubber-like products. The cured resins are thermosetting in nature and tend to produce a stiff adhesive film. However, the unusual compatibility of partially polymerized furane derivatives with various resins and rubber-like materials assists the establishment of a firm bond.

The furfural resin adhesives, called Resin X and Resin X-1, are respectively a 100% stable liquid resin and a partial polymer dissolved in a solvent. They are activated for use by a mild acid catalyst. A wide range of viscosities can be prepared of the partially polymerized furane resins, from as low as 10 cps. to several thousand centipoises, though several hundred centipoises are preferred for the adhesive grade.

In its application to natural or synthetic rubbers, some cyclization of the rubber surface with a strong mineral acid prepares the rubber for the application of the adhesive. After cyclization the rubber is, of course, thoroughly washed to remove traces of acid. A number of applications of synthetic rubbers such as Chemigum, Buna S, or neoprene to plastic parts have worked out successfully. These adhesives are particularly effective upon unsanded laminated phenolics, exhibiting a glue line stronger than the shear strength of the material at about 4000 p.s.i.

The 100% liquid resin adhesive (Resin X) may be cured at contact pressure and at room temperature if necessary. Full strength is developed after several days, though overnight at 120°F. will effectively cure the resin.

Masking with Rubber

MANY interesting methods and processes are developed each year which utilize or are made possible by rubber products of one kind or another. Included among such processes in recent years is one of masking various metal objects which are subjected to plating or painting and which require that certain surface areas be kept clean during such operations. This process is made possible by rubber "masks" developed by Duggan Masking Devices, of Detroit, Mich.

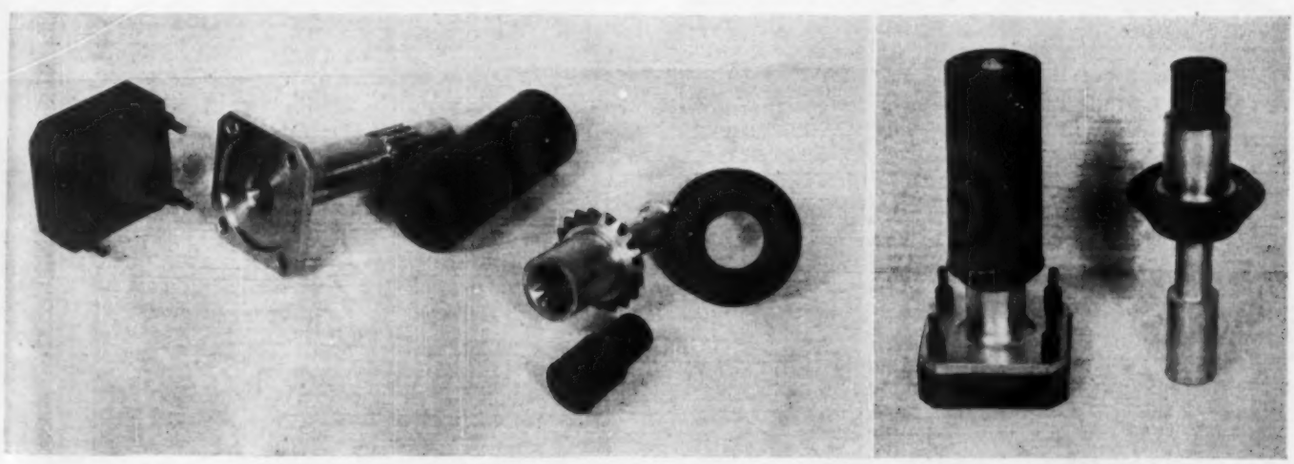
The principle of the rubber masks is clearly evident in the accompanying illustrations. Precision molded to match specific objects, the masks snap on and off with comparative ease. Compared with other masking methods, such as the application of wax, the new method yields significant savings in manpower, machine hours, materials and space. In the wax method, for example, the general practice is to completely coat the object with the wax, and then cut away the wax at the specific spots where painting or plating is to be accomplished. Subsequently, the complete coating must be removed.

A time study conducted by an airplane manufacturer indicated that it took 7.98 minutes to plate a brush cap with the wax masking method as compared with only .99 minutes with the rubber masking method. Similar time savings were indicated for other parts, including governors, lock rings, brush housings and clamp levers.

Special rubber compounds are of course formulated for each specific job, since the efficiency of the compound is dependent on the metal to be plated or painted. Variations in the compounds are basically in hardness, the degree of which depends on the size and shape of the part to be masked. From the size angle, parts as small as a 1-inch diameter gear and as large as gears measuring 13 inches in diameter and 4 inches in thickness have been masked successfully. While time saving is the biggest advantage of the rubber masking method, better and more consistent quality is also claimed for it.

As indicated above, the Duggan rubber masks are easily and quickly snapped onto metal parts and only exposed surface areas will receive plating or paint.

The masks developed by Duggan Masking Devices may be made of natural or synthetic rubber, although at present they are being made largely of the latter material. Two basic types of synthetic rubber have been found suitable for practically all kinds of metal plating except chromium. One type is especially adaptable for bright nickel and silver plating, while the other performs best for cadmium, lead, tin, zinc, and copper. Although initial cost of the rubber molds is rather high compared with other masking methods, ultimate savings are reported to more than prove their worth.



Ordinarily, masking the flat end of the metal part seen at the left (above) would be a difficult operation, but it is simplified by the use of rubber masks, as indicated by the photograph at the right. The prongs of the rubber mask are pulled through the bolt holes in the metal part so that the undercut block takes a tight vacuum grip on the bottom to seal the edges.

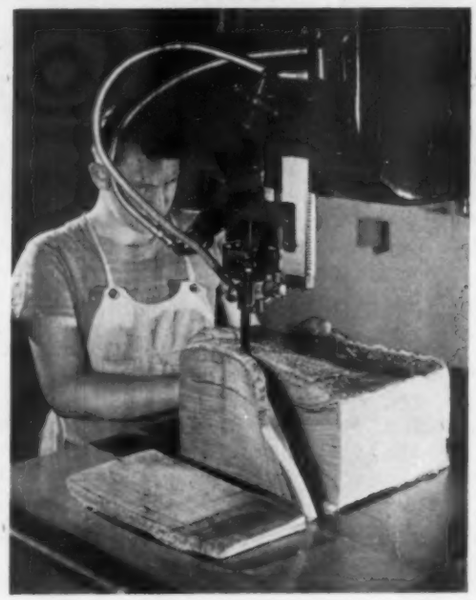
New Developments Simplify Band Sawing of Rubber

PRECISION saw bands of modern design combined with a substantial increase over conventional velocities constitute new developments which simplify the band sawing of rubber and other materials. The band sawing of rubber in its various forms has always been more or less of a problem since, conventionally, a slow cutting rate is employed or the saw is "doctored" and its efficiency to cut other materials thereby impaired.

A new type of saw band developed by Continental Machines, Inc., Minneapolis, Minn., illustrated herewith, is of coarse-pitch design and provides maximum band strength with narrower bands. Elimination of the deep, wedge-shaped gullets is said to result in greatly increased tooth rigidity and since chips cannot wedge into the gullets the cutting action is cool and vibrationless. Other advantages claimed for the new saw include improved tensile strength, minimum stress concentration, and ample guiding width. A cutting rate 2 to 10 times above other saws is also claimed.

Rubber, crude or synthetic, whether soft or hard, responds well to velocities of 4,000 to 5,000 f.p.m. and no coolant is necessary. Four widths of bands are available, i.e., ¼-inch—4 and 6 pitch, ½-inch—3 and 4 pitch, ¾-inch—3 pitch, and 1-inch, 2 and 3 pitch. Good results have also been reported at lower velocities with some of the narrower bands. Current applications of the saw bands in the rubber field include ordinary and wire-reinforced hose, hard rubber tubing, and molded goods in general. Even sponge rubber may be sawed clean, but this operation requires some form of friction drag eliminator.

According to the manufacturer, the new type saws are by no means limited to high velocities and they give excellent results with any rigidly constructed equipment capable of being stepped up to at least 2,000 f.p.m. although they deliver their maximum production and highest finish at their intended high velocity speeds. Resharpening is never required for these saws, so that the initial cost represents final cost.



Butyl rubber being band sawed.

Neoprene Peptizer P-12

AN interesting new material, the principal effect of which is to retard the recovery of neoprene stocks during storage, has been introduced by the Caldwell Co., 2412 First Central Tower, Akron 8, Ohio. Called Neoprene Peptizer P-12, it is a white, free-flowing, non-packing, powdered solid, with a specific gravity of 1.04. It is primarily intended for peptizing Neoprene GN. The beneficial effect of the material is said to be specially noticeable in cases where neoprene is applied to fabric and held for later assembly into a fabricated piece. The building properties of the coated fabrics, after storage in books, are particularly said to be greatly improved.

According to the Caldwell concern, Peptizer P-12 is definitely not an antiscorch or a retarder in the generally accepted sense of those terms, and its action does not parallel that of benzothiazyldisulphide or sodium acetate. All known peptizers of neoprene are slightly activating at curing temperatures, and accordingly the use of from 0.5 to 1.0% of an acceptable retarder is suggested when Peptizer P-12 is employed if the stocks appear critical in processing.

Scorching of stocks which have been mixed and then held in storage may easily be due to the nerviness of the stock due to bin polymerization and if "scorching" is induced by such storage then the use of the peptizer will be helpful. This is, however, the only sense in which the new material can be considered as an "antiscorch."

In application, it is recommended that from 1.0 to 2.5% of Peptizer P-12 be used for stocks carrying a pigment load of 10 volumes or less, the specific amount being dependent on the severity of storage requirements. For stocks carrying higher pigment loading, slightly greater amounts are suggested, but laboratory experiments have indicated that in no case should more than 5% be used. All amounts are figured on the neoprene. The peptizer should be added early in the mixing cycle since dispersion of pigments will be benefited. In aggravated cases of stickiness, addition of the peptizer after the pigments or along with them is permissible.

For average service requirements, a zinc-magnesia ratio of 6 to 3 is usually recommended, while for heat-resisting stocks, or stocks subject to difficult aging specifications, the ratio is increased, with some compounders going as far as a 10 to 1 ratio. Peptizer P-12 has been found to be increasingly helpful in the high zinc stocks. Success in making 50% zinc masterbatches and holding them at normal factory temperatures for four days with no resulting signs of instability have been reported. Unusually long storage periods, it is pointed out, may call for a second addition of Peptizer P-12 from 8 to 48 hours before processing.

Fairlead Made by Cycle-Weld Process

A NEW type of fairlead for airplanes, made of plastic and two tiny pieces of rubber, which is snapped into panel openings instead of bolted as in the conventional manner, has been developed by the Cycle-Weld Division of the Chrysler Corporation, and is being manufactured in the Chrysler Motors of California plant at Los Angeles, Calif.

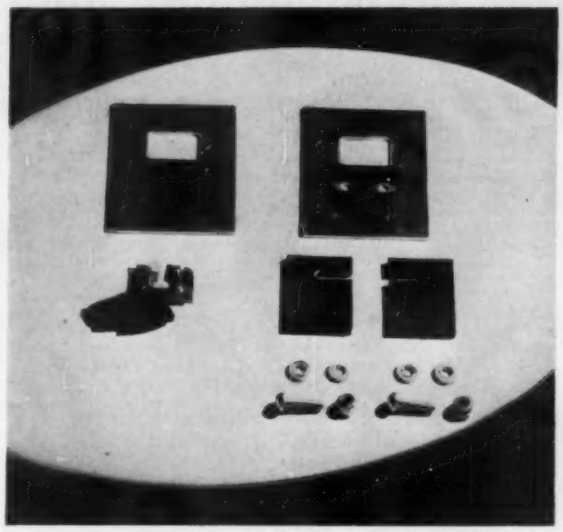
Known as the Cycle-Weld Snap Lead, and weighing but 5 grams, the new device can be installed in ten to 30 seconds compared to two to 10 minutes for the present 26.2 gram type of fairlead made of bolted phenolic laminated plates. Two tiny rubber strips which serve the dual purpose of holding two companion plastic pieces together, and providing an elastical grip as the lead is snapped into panel slots, are held in place at four opposite points by the Cycle-Weld process of cement-binding developed by Chrysler.

Rubber Strips Hold Leads in Place

Pressed firmly with the thumb, the new type of lead is snapped into panel openings for that purpose after the control cable has been inserted in the lead itself through holes formed on one side of the lead while the rubber strips are relaxed. Two tiny ridges—at the top and bottom of the Snap Lead—grip the edges of the panel slots. Tension set up by the rubber strips sets and holds the leads into place. When pressed into position the two plastic pieces form a single unit containing a hole of either three-sixteenths or one-quarter inch in diameter through which the flexible metal leads, or cables, pass from various controls of the plane to pilots' cabin.

In one type of fighting aircraft now playing an important role in prosecution of the war, 610 fairleads are used in guiding the control cables. In the nut-and-bolt type of fairlead the weight of 610 units on installation is 35 pounds, while the plastic-and-rubber types weigh but seven pounds. On the basis of airline computations showing that each pound saved in the construction of an airplane is worth an expenditure of $300, the new Cycle-Weld fairleads would represent a saving of $8400 in this type of aircraft.

Before a fairlead can be placed into position in the panel of an airplane, a small pulley-like control attachment must clear the slot through which the cable is threaded. As seen in this illustration, the new Snap Lead allows for this operation.



The two types of fairleads used to hold cables in airplanes are shown above. At the right is the complicated fairlead formerly used, made up of two laminated phenolic strips, held together by nuts, bolts and washers, while the new Snap Lead, made of two pieces of plastic, held together by tiny rubber strips, is at the left.

In addition to the saving in weight and installation costs the Snap Lead has proved in tests that it will withstand more wear than the present types of leads. A belled surface at the mouth of each hole minimizes the possibility of rubbing and resulting frictional wear as the cables move backward and forward. One person, without a tool of any kind, can snap the lead into place with one hand, while two hands and perhaps two persons in some areas of the plane's interior, equipped with a screw driver and a small wrench, are required to install the older type lead.

Dimensions of Cycle-Weld Fairlead

When snapped into position the Cycle-Weld fairlead is but one and 1/16th inches long. It is only seven-eighths of an inch wide, and one-half inch thick. The rubber strips holding the halves together are only three-eighths inches wide, less than one-eighth inch thick, and approximately two-eighths inches long.

The Cycle-Weld process can be used to bind woods, metals, ceramics, thermosetting plastics and rubber, or any of their combinations. The cement is applied to the surfaces, and after undergoing heat treatment forms bonded units free of rivets, bolts or clamps.

Abstracts of United States Patents on the Compounding and Use of Synthetic Rubber

By FREDERICK MARCHIONNA, M. S. Chem.

Part XIV

McKinney and Mayberry—U. S. Pat. 2,316,964—April 20, 1943. *Mastic Composition.* (Assigned to the Pure Oil Co., Chicago, Ill.).

A tough mastic product comprises a sulfurized diolefine polymer, a factice and fillers. The sulfurized diolefine polymer is obtained by heating a mixture of sulfur and a hydrocarbon polymer containing a preponderance of a diolefine, and recovered from the selective catalytic polymerization of petroleum hydrocarbons containing the diolefine. More particularly, the polymer is obtained from gasoline by passing cracked gasoline vapors through a tower containing a clay as catalyst, and kept at 150° to 400° F. to recover a liquid polymer. About 70 parts of this polymer containing the diolefine is mixed with 30 parts of sulfur, and the mixture heated at 90° to 140° C. for 5 to 7 hours. The mastic may be prepared by mixing 21.3 parts of the above sulfurized polymer with 10.7 parts of a linseed oil factice, 18.6 parts of whiting, 47.9 parts of asbestos, and 1.5 parts of red iron oxide. Or 27.5 parts of the sulfurized polymer can be admixed with 13.7 parts of a linseed or China wood oil factice, 24 parts of whiting, and 34.8 parts of asbestos, with or without a small quantity of carbon black, to form a tough but slightly soft mastic mixture.

Koch and Gartner—U. S. Pat. 2,317,385—April 27, 1943. *Plasticized Butadiene Interpolymers.* (Assigned to Jasco, Inc., New York, N. Y.).

In a method of plasticizing butadiene polymers and interpolymers, and more particularly the interpolymers of butadiene with styrene, acrylic nitrile, fumaric acid esters, methyl vinyl ketone, dichloroethylene, etc., the polymerized mixture is subjected to an oxidizing treatment with free oxygen at temperatures above 80° C., in the presence of about 4% of an anti-oxidant, such as aryl amino anthracene, aldol naphthylamine, diaryl phenylene diamine, alkylated phenols, etc. In the preferred method, the interpolymer, in the form of latex, is subjected to oxidation in the presence of a large quantity of the anti-oxidant which should be sufficient to prevent cyclization of the polymer. The preferred anti-oxidant is an oily condensate obtained from a mixture of 104 parts of styrene and 94 parts of phenol which is treated as described in U. S. Patent 2,224,837. About 20 parts of this oily product are dissolved in 50 parts of benzene, and the resulting solution spread on a thin sheet from an interpolymer of butadiene with styrene containing 3% of phenyl beta-naphthylamine, so that the sheet will absorb about 1% of the oily condensate. The sheet thus treated is then subjected to drying at 120° to 130° C., for about one-half hour, obtaining a transparent plastic product. An interpolymer from the emulsion polymerization from 10 parts of styrene and 90 parts of butadiene is mixed with 3% of isobutyl phenol disulfide or methyl phenol disulfide, either with the latex or with the coagulated mass. The solid mixture is then heated in an autoclave for 1 to 1½ hours, to obtain a soft plastic mass. Or crumbs of the polymer may be placed in perforated trays, together with an anti-oxidant, and heated at 130° C. at a pressure of 3 atmospheres for 40 to 80 minutes, while air is passed through the trays. The crumbs are converted into a plastic, coherent mass. An interpolymer from 75% of butadiene and 25% of acrylic nitrile is mixed with about 3% of phenyl beta-naphthylamine, and heated in presence of air, at 130° to 140° C., from 1 to 3 hours, obtaining a product of increased plasticity.

Seaton—U. S. Pat. 2,317,409—April 27, 1943. *Tensioned Polymeric Materials.* (Assigned to B. F. Goodrich Co., Akron, Ohio).

Plastic and elasto-plastic polymers, such as rubber hydrochloride, polychloroprene, Thiokol, interpolymers of butadiene with styrene or acrylic nitrile, polyvinyl chloride, polyvinyl acetate, etc., when formed into sheets, threads, tubes, etc., will have internal stresses exhibiting grain appearance. This is believed to be due to deformations during the forming process, which causes a decrease in longitudinal extensibility with low resistance to tear in one direction. These stresses in the above anisotropic thermoplastic substances may be relieved by passing sheets or strips of the polymer through a heating zone in a downward path, at such progressive increasing temperatures that the stresses are relieved. During the heat treatment the sheets are exposed to radiant heat, and kept without any tension. After leaving the heating zone, the polymer is passed through a cooling fluid, such as water, where it is made to travel in a horizontal path, after which it is subjected to tension to compensate for the longitudinal shrinkage undergone during the heat treatment. Tensioning is conveniently effected by use of a number of rolls, running at differential speeds, soon after the polymer leaves the cooling bath. In the specific example, a plasticized polyvinyl chloride containing an equal weight of tricresyl phosphate, or a polychloroprene, is calendered into a sheet at about 120° C. This sheet will shrink to two-thirds of its original length when heated at 150° C. The sheet is fed vertically downward between heating elements from an electrical device, or high frequency current, cathode rays, etc., where it is subjected to heat at about 150° C. or above, and then passed under rolls in cold water, and finally stretched to relieve the stresses.

Calvert—U. S. Pat. 2,317,730—April 27, 1943. *Composite Paper Products.* (Assigned to Marbon Corp., Chicago, Ill.).

A laminated product comprises sheets of paper joined together by means of a rubber cement, or an adhesive from polychloroprene, Thiokol, Koroseal, etc. Such cements should preferably contain a quantity of a wax so as to increase the water resistance of the composite article. The composite sheet thus produced may be coated on one or both faces with a moisture-proof coating from a composition containing an amorphous rubber hydrochloride with 10% of a polyamyl naphthalene and 1% paraffine wax dissolved in 555 parts of toluol. This coating is dried in a horizontal drying tunnel in which there is circulated hot air at 160° to 170° C. with a 50% relative humidity.

Instead of the rubber hydrochloride there may be used a moisture-proof coating from a cyclized rubber. This coating may comprise a Pliolite cyclized rubber having an unsaturation of about 14%, with about 10% of a hydrogenated rosin ester, and 10% of paraffine wax dissolved in 300 parts of a petroleum solvent. When the paper sheets to be laminated are from tissue paper, this is preferably coated first with a rubber hydrochloride film. Such a laminated paper product may be folded and heat sealed at the edges to form waterproof bags, particularly adapted for holding brine, oils, etc.

Joyce and Geyer—U. S. Pat. 2,318,693—May 11, 1943. *Shredding Rubbers.* (Assigned to General Motors Corp., Detroit, Mich.).

Crude or vulcanized rubber, polychloroprene, polyisoprene, etc., can be quickly shredded into powder by dissolving a fluid from the class consisting of ammonia, methyl chloride, sulfur dioxide, hydrogen sulfide, nitrous oxide, propane, ethane and ethylene, into the polymer under high pressure. When this pressure is suddenly released, the polymer will be shredded by the quick expansion of the dissolved fluid. Thus, the polychloroprene, reclaimed rubber, polyisoprene, etc., preferably in thin sections, is placed in a closed chamber; ammonia vapor is then introduced and heated so that it will have a pressure of about 1500 lbs./sq. in., whereby the vapor is dissolved in the polymer. When a valve in the closed container is opened, the rubber containing the dissolved ammonia is blown into a chamber kept at atmospheric pressure, so that the ammonia expands suddenly, thereby causing an explosion of the polymer into fine powder.

Craig—U. S. Pat. 2,318,758—May 11, 1943. *Preserving Rubbers.* (Assigned to B. F. Goodrich Co., Akron, Ohio).

The aging properties of rubber, polybutadiene, polychloroprene, and polymers of butadiene with styrene, acrylic nitrile, methyl acrylate, alkyl methacrylate, etc., are improved by incorporating in the crude rubber, or in the latex, a small quantity of the reaction product of indene with a secondary diarylamine. More specifically the anti-oxidant is obtained by condensing indene with diphenylamine in the presence of a condensation catalyst which may be aluminum chloride, zinc chloride, etc.

McGill—U. S. Pat. 2,319,074—May 11, 1943. *Artificial Leather.* (Assigned to Imperial Chemical Industries, Ltd., London, England).

Leather cloth of good appearance and durability is obtained by coating a fabric with an elastic chlorinated polyethylene, and surfacing the sheet with a nitrocellulose lacquer, preferably with an intermediate resin coating containing a suitable plasticizer which is also a plasticizer for the nitrocellulose surface coating. In the example given, a cotton fabric is coated with several films from a composition containing 1 part of a chlorinated polyethylene having a chlorine content of 26%, 1 part of a chlorinated polyethylene having 46% chlorine content, and 2 parts of yellow ochre dispersed in 2 parts of benzol. Each coating is dried before the next one is applied. When 4 ounces of dry coating per square yard has been applied, a plasticizer film from a mixture of 4 parts of methyl methacrylate and 3 parts of dibutyl phthalate dissolved in 40 parts in an 8:2 mixture of benzol and alcohol is applied. Other alkyl or alkoxy methacrylates or an emulsion polymerization of methyl methacrylate and 2-ethyl hexyl methacrylate may be substituted for the methyl methacrylate. The surfacing layer from a nitrocellulose lacquer is next applied. This lacquer is prepared by dissolving a mixture of 2 parts of nitrocellulose, 4 parts of castor oil, 4 parts of zinc chromate in a 2:3 mixture of ethyl acetate and alcohol, using 12 parts by volume. A layer of this lacquer weighing 1 to 1½ ozs. (dry weight) per square yard will provide a satisfactory surfacing layer. Such an oil cloth has a high stability to ultra-violet light and a greater scratch hardness than a similar fabric coated only with the chlorinated polyethylene. The coated fabric may be embossed.

Sauser—U. S. Pat. 2,319,634—May 18, 1943. *Plasticized Butadiene Interpolymers.* (Assigned to B. F. Goodrich Co., Akron, Ohio).

Butadiene polymers or interpolymers of butadiene, isoprene, dimethyl butadiene, piperylene, chloroprene, etc., with styrene, vinyl naphthalene, isobutylene, acrylonitrile, alpha-methacrylic nitrile, alpha-chloracrylic nitrile, methylacrylate or methacrylate, a-chloromethacrylate, vinylidine chloride, methyl isopropyl ketone, methyl vinyl ketone, etc., can be plasticized by incorporating a softener from the class consisting of dodecane nitrile, tetradecane nitrile, hexadecane or octadecane nitrile, 9-octadiene nitrile, or any other aliphatic open chain nitrile which contains at least 10 carbon atoms. This type of plasticizer may be added to the monomers before or during polymerization, or can be milled into the polymer. For example, 50 parts of 9-octadecane nitrile are incorporated in 100 parts of an interpolymer from the emulsion polymerization of 55 parts of butadiene and 45 parts of acrylic nitrile. A vulcanizate from such plasticized interpolymer has an unusually high tensile strength.

Francis—U. S. Pat. 2,319,809—May 25, 1943. *Mixed Textile Fabrics.* (Assigned to Sylvania Industrial Corp., Fredericksburgh, Va.).

A fabric is produced from yarns consisting of a mixture of non-adhesive natural or synthetic fiber and a potentially adhesive fiber which is non-tacky at ordinary temperature, but develops adhesiveness when heated at temperatures below that at which the fiber will be damaged. The non-adhesive fibers include cotton, flax, jute, wool, hair, silk, asbestos, glass, regenerated cellulose, as well as cellulose ether, etc. The potentially adhesive fibers comprise condensation or polymerized resins, such as Thiokol, Koroseal, polybutadiene, polychloroprene, etc. In the production of preshrunk fabrics, the non-adhesive fibers and the thermoplastic fibers are mixed, using preferably small quantities of thermoplastic fibers, and the mixture then worked into yarns and into woven or knitted fabrics in any convenient manner. The fabric produced is next stretched to cause a kind of "weaving contraction" in the direction of the filling threads. While in such a stretched condition, the fabric is moistened and plasticized with a selective plasticizer for the thermoplastic fibers. The moistened fabric is now passed over a heated calender to render the thermoplastic fibers tacky, and then shrunk, and subjected to heat and pressure to set the "weaving contraction." When cooled, the thermoplastic fibers will be non-tacky, and there is effected a permanent adhesion between the two kinds of fibers. If desired, the plasticizer may be removed by passing the preshrunk fabric through a solvent bath for the plasticizer which has no effect on either of the two kinds of fiber. The fiber may then be dried and rolled. In the example, the fabric may be made from yarns produced from a mixture of 90 parts of cotton sliver and 10 parts of polybutadiene, polychloroprene, ethyl cellulose, or other synthetic thermoplastic fibers.

Wallach—U. S. Pat. 2,319,834—May 25, 1943. *Mixed Textile Fabric.* (Assigned to Sylvania Industrial Corp., Fredericksburgh, Va.).

A modification of U. S. Patent 2,319,809 for producing preshrunk fabrics from mixtures of thermoplastic and non-thermoplastic fibers. The fabric may be made from a mixture of 80 to 90% of non-thermoplastic fibers and 20 to 10% of thermoplastic fibers from polybutadiene, polychloroprene, Thiokol, Koroseal, cellulose ether, etc. The fabric thus obtained is then treated with a non-solvent swelling agent, preferably water in heated condition, stretched in one direction while permitting shrinkage in the other direction. The unstretched yarns acquire additional crinkle. The fabric is next dried while in a stretched condition, and treated again in the heated water while under no tension whatsoever, causing swelling of the yarns and shrinkage of the stretched yarns. The fabric thus shrunk is then treated with a solvent for the potentially adhesive fibers to effect a permanent bond between the thermoplastic and the non-thermoplastic fibers. The solvent may be evaporated while the fabric is under pressure so as to assure permanent adhesion of the fiber mixture in the yarns.

Scott—U. S. Pat. 2,319,953—May 25, 1943. *Heat Stable Polymers.* (Assigned to Wingfoot Corp., Akron, Ohio).

Vinyl halide polymers, or interpolymers of vinyl halide with butadiene, isoprene, styrene, acrylic nitrile, vinyl esters, vinyl ethers, vinyl ketone, etc., are rendered heat stable by incorporating small quantities of about 3% of a compound from the group consisting of the phthalimides of alkali metal, alkali earth metals and lead. For example, 100 parts of an interpolymer from 85 parts of vinyl chloride and 25 parts of vinylidene chloride or a diolefine are compounded with 40 parts of tricresyl phosphate and heat stabilized by incorporating in the mixture about 3 parts of sodium, lithium, calcium, etc., phthalimide.

Scott—U. S. Pat. 2,319,954—May 25, 1943. *Heat Stable Polymers.* (Assigned to Wingfoot Corp., Akron, Ohio).

Polyvinyl chloride or interpolymers thereof with butadiene, isoprene, vinylidene chloride, styrene, etc., are rendered resistant and stable against heat by incorporating in the polymer, either in the solid or in its latex form, from 1 to 3% of para-toluene sulfonamide, naphthalene sulfonamide, naphthyl sulfonamide, or a sulfonamide of sodium, potassium, lithium, barium, calcium, strontium, magnesium or lead. In the example given, an interpolymer of butadiene with vinyl chloride, or an interpolymer of vinyl chloride and vinylidene chloride, is compounded with 40% of a plasticizer, such as tricresyl phosphate, and 3% of lithium sulfonamide or other heat stabilizing compounds.

Tierney—U. S. Pat. 2,319,959—May 25, 1943. *Adhesive Cements.* (Assigned to Minnesota Mining and Manufacturing Co., St. Paul, Minn.).

A flexible, transparent adhesive cement comprises a hydrogenated coumarone-indene resin and an elastomer, such as natural rubber, polychloroprene, or polyisobutylene, with or without a small quantity of Pliolite. Ordinarily, from 20 to 90 parts of a hydrogenated coumarone-indene resin (Nevillite resin) for each 100 parts of elastomer will produce a good tacky cement. In the example, in which Pliolite is used, the adhesive cement is obtained by mixing 150 parts of natural latex or polychloroprene, or preferably a polyisobutylene having an average molecular weight of 115,000, with 50 parts of Pliolite, 50 parts of paraffine oil, and 50 parts of hydrogenated coumarone-indene resin dissolved in 750 parts of heptane or similar solvent Hydrogenated rosin, ester gum, hydrogenated methyl abietate, zinc or calcium abietate, pentaerythrol abietate, terpene resins, etc., may be added in suitable quantities.

Thomas—U. S. Pat. 2,320,313—May 20, 1943. *Cable Insulation.* (Assigned to Jasco, Inc., New York, N. Y.).

An insulated cable which is resistant to moisture, ionization and corona effects, while having low dielectric capacity, comprises a metallic conductor, which may be single, braided, or stranded, and an insulation layer from an interpolymer of butadiene with isobutylene obtained at very low temperatures with aluminum chloride or boron trifluoride, etc., as catalyst. This insulating interpolymer product is compounded with sulfur, fillers, etc., and applied either over the bare conductor or over a fiber or wire reinforcement covering. It can also be used as an outer jacket to replace the lead or other metal jacket used for the purpose. In order to increase the inductive impedance of the cable and balance the interconductor capacitance, and thereby minimize the alternation of vibratory current in the cable, the conductor, or preferably two such conductors, are braided, and a cylindrical layer from the interpolymer applied, followed by a spirally wrapped layer of Permalloy. The insulating layer may be from a composition comprising 100 parts of the interpolymer from 20% butadiene and 80% isobutylene, 15 parts of whiting, 5 parts of zinc oxide, 5 parts of stearic acid, 5 parts of sulfur, and 4 parts of an accelerator. The 15 parts of whiting may be replaced in part with a carbon black. About 10% of carbon black will not affect the electrical insulating characteristics of the insulation. An outer jacket layer may comprise 150 parts of carbon black and 100 parts of the interpolymer. The insulated cable may be vulcanized at about 120° to 140° C., for two hours or more.

Paul—U. S. Pat. 2,320,745—June 1, 1943. *Preserving Rubber Products.* (Assigned to U. S. Rubber Co., New York, N. Y.).

Natural rubber, polychloroprene, polybutadiene, etc., can be preserved against the deteriorating effects of air and light by incorporating in the crude polymer, or in the latex, or by painting the surface with an anti-oxidant consisting of 1.3-diaryl-1.3-dialkyl cyclobutane having one of the aryl groups directly connected, in the para position, to the secondary amino nitrogen atom of the —NH—R grouping, in which R is the aryl group. Such anti-oxidant compounds include 1-(para-beta-naphthylamine phenyl)-3-phenyl-1.3-dialkyl cyclobutane, 1-(para-anilino phenyl)-3-phenyl-1.3-dialkyl cyclobutane, etc.

Paul—U. S. Pat. 2,320,746—June 1, 1943. *Preserving Rubber Products.* (Assigned to U. S. Rubber Co., New York, N. Y.).

The aging quality of natural rubber, polybutadiene, polychloroprene, etc., is enhanced by painting the surface, or by incorporating in the polymer solid or latex, an anti-oxidant resulting from the reaction of a butadiene hydrocarbon compound with a phenol. The phenol may be hydroquinone, resorcinol, catechol, pyrogallol, phloroglucinol, etc. The butadiene hydrocarbon may be 1,1-dimethyl butadiene, 1,3-dimethyl butadiene, 2,3-dimethyl butadiene, 1,2-diethyl butadiene, etc. These reaction products are termed chromane. Thus, the reaction of hydroquinone and butadiene is called a chromane which may consist of 2-methyl-6-hydroxy chromane and 4-methyl-6-hydroxy chromane. Other reaction products may be benzo-para-dimethyl chromane, 2-ethyl-5-hydroxy chromane, etc. In the production of these chromanes there are used halogen acids, sulfuric acid, aluminum chloride, etc., as catalyst.

Beebe—U. S. Pat. 2,320,999—June 8, 1943. *Bonding Synthetic Rubber to Metal.* (Assigned to Scovill Mfg. Co., Waterbury, Conn.).

Natural rubber, polychloroprene, chlorinated rubber, or rubber hydrochloride, and butadiene-acrylic nitrile interpolymers, can be effectively bonded to aluminum by first subjecting the surface of the aluminum metal to the action of an aqueous alkaline solution containing a colloidal suspension of alumina, titania, zirconia, or berillia, together with another metal dissolved in the alkali solution, which may be a copper or a compound of the iron group, and also a substance which is capable of forming complex ions, and includes phosphates, thio phosphates, citrates, etc. This treatment causes the formation of an adherent oxide coating of a hydrated amphoteric metal oxide carrying an oxide of the other metal. Rubber, chlorinated rubber, polychloroprene, butadiene-acrylic nitrile interpolymer, etc., can then be bonded over this oxide coating, with or without an intermediate cement coating. In an example for bonding a polychloroprene to the inner or hub portion of a propeller of aluminum alloy containing zinc, the propeller blade is buffed with a buffing compound containing alumina grains, and immersed in a bath kept at 160° to 180° F., consisting of 10 liters of an aqueous concentrated solution of sodium hydroxide, 300 grams of cupric hydroxide, 2000 grams of sodium hyposulfate, 500 grams of ammonium carbonate, 50 grams of 85% phosphoric acid, and 90 liters of water. The aluminum is kept in this bath for about one-half hour, and then dipped in water and dried. A film of polychloroprene cement is applied over the treated surface which is dried into tacky condition, after which a thin sheet of a polychloroprene is laid over the cement on the part of the propeller blade which is to be provided with a fairing. The assembly is next introduced in a mold, with a vulcanizable sponge rubber, and the article heated under pressure to vulcanize the rubber. The article thus produced is then covered with a non-porous polychloroprene layer, and placed in a finishing mold of a contour conforming to the desired fairing, where it is subjected to heat and pressure, whereby the coherence of the polychloroprene with the metal exceeds the breaking strength of the rubber. The polychloroprene layer should be applied to the metal as soon as the aluminum is treated with the alkaline aqueous solution containing the metal oxides. If the poly-

chloroprene is not applied soon, then the article should be dipped in dilute aqueous ammonia for a few minutes and dried to restore the coherent quality of the coating, and the rubber then bonded thereto.

Saunders and Morrison—U. S. Pat. 2,322,886—June 29, 1943. *Adhesive Cement.* (Assigned to Chrysler Corp., Highland Park, Mich.).

An improved rubber cement is produced by incorporating a diolefine polymer in a fused mass containing natural rubber, asphalt, rosin, ester gum, and fillers, if desired. The particular diolefine polymer is one sold as "Petropol," and is obtained from distillates of hydrocarbons cracked at temperatures above 1000° F. These distillates which contain the diolefine can be polymerized with sulfuric acid or Fuller's earth as catalyst to produce oil polymers of high viscosity containing from 60 to 90% of the polymerized diolefine. The solid polymer may then be recovered by steam treatment under a vacuum. Such a polymer has an iodine number of 175 or higher. In the example, 33.5 parts of asphalt and 7.1 parts each of rosin and ester gum are fused, and 28.5 parts of rubber with 23.8 parts of "Petropol" added. The rubber is preferably in the form of tire scrap. The mass is heated to about 480° F., to form a homogeneous fused cement, and 3.8 parts of iron oxide, 3.3 parts of sulfur, 2.9 parts of hydrated lime, and 2.9 parts of zinc oxide incorporated. The fused mass is cooled by pouring in cold water; it is then milled and dissolved in naphtha or other solvent containing about 5% of ethyl alcohol to form an adhesive of desired consistency. When it is desired to produce an aqueous dispersion cement, about 400 parts of the fused mass are combined with 100 parts of reclaimed rubber, 40 parts of rosin, 25 parts of rosin oil, 12 parts of stearic acid, and 80 parts of tricresyl phosphate by milling at 150° to 160° F. About 295 parts of water are then added gradually in increments of 5 parts, until about ¾ of the total quantity has been incorporated, at which stage the mass is in the form of a paste in which water is the dispersed phase. When the balance of the water is added there is an inversion of phase in which the solids in the cement are dispersed in the water. Such cement has a high solids concentration, but a low viscosity, and can be diluted to any desired consistency. The addition of about 10% of cumar resin will improve the adhesive power of the cement. During the cure of the cement the "Petropol" will be further polymerized into a non-thermoplastic polymer.

Harvey—U. S. Pat. 2,323,130—June 29, 1943. *Polychloroprene-Cashew Liquid Products.* (Assigned to the Harvel Corp., East Orange, N. J.).

Rubber-like products having varying characteristics are obtained by mixing a polychloroprene (Neoprene Type G) and a cashew nut liquid polymer known as "Cardolite-816," or "Cardolite 869," or "Cardolite-619," or "Cardolite 446." One composition may contain 100 parts of Neoprene G, 50 parts of Cardolite 446 (which is a cashew nut liquid polymerized into a resilient, elastic solid), 36 parts of Micronex carbon black, 4 parts of light magnesia, 5 parts of zinc oxide, and 2 parts of di-ortho-tolyl-guanidine. Instead of Cardolite 446, there may be used in the above composition any of the other Cardolites. These various compositions can be prepared by milling or masticating the ingredients together. The compositions can be cured at various temperatures to obtain oil-resistant products. Another composition may comprise 150 parts of Neoprene G, 50 parts of amyl ether of cashew nut shell liquid thickened by heating, 56 parts of Gastex black, 8 parts of magnesia, 10 parts of zinc oxide, and 2 parts of hexamethylene tetramine.

Andrews and Reeves—U. S. Pat. 2,323,185—June 29, 1943. *Rubber Hydrohalides.* (Assigned to Bay Chemical Co., New Orleans, La.).

Rubber hydrochloride, rubber hydrobromide, or rubber hydroiodide, from natural rubber or polybutadiene rubber, can be prepared by reacting the rubber in solution in a volatile solvent, in the presence of a fluidity agent having a good solubility for the rubber hydrohalide. The fluidity agent is preferably n-butyl alcohol; but aliphatic alcohols having from 1 to 6 carbon atoms, monobasic acids containing from 1 to 5 carbon atoms, and glycols are all suitable as such agents. The solvent employed may be benzene, toluene, xylene, chloroform, carbon tetrachloride, ethylene or propylene dichloride, etc. For example, 100 parts of natural rubber or a polybutadiene is dissolved in 820 parts of benzene and 80 parts of n-butyl alcohol, and hydrogen chloride passed through the solution at 10° to 35° C., from 2½ to 4 hours. When the reacted solution is somewhat viscous, a naphtha is gradually added until 1900 parts thereof have been added. The rubber hydrochloride first gels, and then precipitates into a lumpy mass which is neutralized with soda ash, filtered, and steam distilled in the presence of a wetting agent to prevent agglomeration. In a modification, the rubber solution may be partly hydrochlorinated, and after or before precipitation treated with more hydrogen chloride. Thus, 100 parts of rubber in 275 parts of benzene, 37.5 parts of n-butyl alcohol, and 550 parts of naphtha are treated rapidly with hydrogen chloride at 20° C. for 2 to 4 hours, to form a viscous solution. By adding 450 parts more of naphtha there is precipitated a product containing 30% chlorine. This is treated with more hydrogen chloride until the rubber hydrochloride contains about 33.5% of chlorine.

Dennstedt—U. S. Pat. 2,323,313—July 6, 1943. *Stable Butadiene Interpolymers.* (Assigned to Jasco, Inc., New York, N. Y.).

Latices from interpolymers of butadiene, isoprene, etc., with acrylic nitrile, styrene, vinyl methyl ketone, etc., are stabilized by adding a small quantity of an anti-oxidant, as soon as the interpolymer is formed. The anti-oxidant may be phenyl beta-naphthylamine, dibenzyl naphthylamine, alkyl phenyl disulfide, etc. Besides these anti-oxidants, there is added to the latex a small quantity of a stabilizer from the class of substances of the group consisting of alkali metal hydrosulfites, hydroquinone, hydrogen sulfide or alkali metal salts thereof, ferrous or alkali metal salts of formaldehyde sulfoxylate. The quantity of stabilizer should be sufficient to decompose the peroxide catalyst in the latex, and leave some free stabilizer in the latex. Thus a latex from 75 parts of butadiene and 25 parts of acrylic nitrile is stabilized by adding 3% of phenyl beta-naphthylamine together with 1% of hydroquinone, or 1.5% of hydrogen sulfide, or 1.2% of ferrous sulfate, or 1% of sodium hydrosulfite. An interpolymer from 75 parts of butadiene and 25 parts of styrene in the form of latex can be stabilized by the addition of 3% of phenyl beta-naphthylamine and 1% of linoleic acid.

McDonald—U. S. Pat. 2,323,338—July 6, 1943. *Stable Neoprene Cements.* (Assigned to B. B. Chemical Co., Boston, Mass.).

Stable adhesive cements from deodorized polychloroprene are obtained by dissolving the polychloroprene in a solvent and adding from 1 to 10% of an alkali phosphate, or phosphite, such as monobasic hydrogen phosphate, disodium hydrogen phosphite, etc. This type of salt can be incorporated in the polychloroprene by milling the powdered salt in the polychloroprene sheet, and then forming the cement by dissolving in benzene, toluene, trichlorethylene, etc., with or without a non-solvent liquid, such as naphtha or ethyl acetate. The polychloroprene, however, may be first dissolved in the solvent, and the stabilizing salt then added to the solution. The preferred quantity of alkali phosphate or phosphite is about 3%.

(To Be Continued)

BACK THE ATTACK
BUY
WAR BONDS AND STAMPS

Editorials . . . . . .

Rubber Agreement

ANOTHER meeting of rubber experts of the United States, the United Kingdom, and the Netherlands Indies to continue exploratory discussions of post-war rubber problems is scheduled to be held in Washington later this month. The U. S. State Department has already gone on record that this country will not enter into any definite commitments at present due to the state of flux which exists, but some program is necessary if chaos is to be avoided when the rubber plantations of the Far East are recaptured, and the invasion of Luzon by MacArthur is a big step in that direction.

Were it not for the synthetic rubber plants erected in the United States as a war emergency measure, these plants now producing 800,000 tons of synthetic rubber annually and capable of producing more than 1,000,000 tons if necessary, the problem would be of easy solution. But these plants represent a taxpayer's investment of over $750,000,000, and it is not likely that they will all be scrapped. Military security alone calls for enough of them to furnish 200,000 tons or more a year, while some pressure is being exerted to maintain all of them. Incidentally, it is interesting to note that the total cost of the synthetic rubber plants represents only three days' war expenditures of the United States, estimated at approximately $240,000,000 daily.

Technically, the synthetic rubber plants are considered as government surplus property and presumably will be offered for sale as such sometime in the future. Few manufacturers, however, are interested in purchasing and operating these plants in the post-war period in open competition with the British and Dutch unless some form of government aid is forthcoming. One proposal recently advanced covers continued government ownership of the plants with rental adjustments to compensate private lessees for any loss incurred in meeting the price competition of imported natural rubber. Another is modification of the anti-trust laws so as to permit organization of a government buying pool to purchase the synthetic rubber at a price covering production costs. Many other suggestions have been advanced aimed at continued operation of all present synthetic rubber facilities, including sufficiently high tariffs to protect the domestic product.

The British and the Dutch are naturally apprehensive over the entire situation. Together they have an investment estimated at more than $1,500,000,000 in the natural rubber plantations of the Far East. Some 2,000,000 workers in that area are (or were) dependent on rubber for their income, meager as it may have been. The rubber market may well be glutted in the next few years. Allowing for an increased demand in the post-war period, even approaching 1,600,000 tons a year, supply will still exceed demand substantially. At the end of the war synthetic rubber facilities will be producing approximately 1,000,000 tons, 800,000 tons in the United States and 200,000 tons in Canada, Russia and Germany. Add some 1,800,000 tons of crude rubber and the figure rises to 2,800,000 tons per year, more than twice as much as world consumption in any one year.

Reference to any post-war international rubber agreement always brings forth the statement that the United States holds a "trump" card in its synthetic rubber facilities. But actually, the rubber problem ties in closely with the whole post-war trade problem. If the United States, for example, should withdraw as the world's largest buyer of natural rubber, it would mean a loss of $100,000,000 to $250,000,000 to British, Dutch and other producers. But that would mean fewer dollars in foreign hands to buy American-made automobiles, machinery, wheat and cotton. It would also probably mean depression in the Far East and other rubber-producing areas.

These remarks are not intended to convey the impression that the United States should throttle its synthetic rubber industry for the benefit of the balance-of-payments position of the British or Dutch empires. They are rather intended to emphasize the point that the outlook favors a world agreement of some kind on rubber. Even if the current meetings are restricted to "exploratory" talks and to factual problems of supply and demand, some attention should be paid to the shaping up of an eventual agreement, and the sooner the better.

CURRENT NEWS OF THE MONTH

STEPS TO MEET THE MILITARY TIRE CRISIS INCLUDE DECISION TO BUILD NEW PLANTS

EVERY effort is being expended to meet the crisis which still exists in the military tire situation, although it now appears reasonably certain that the tire manufacturers will more than meet the increased demand from the Army, unless unforeseeable events come across the horizon. Although manpower remains the primary difficulty, shortages of raw materials are in prospect, but steps are being taken to forestall such shortages. Despite efforts of management and labor to step up production all along the line, some labor difficulties have presented themselves in recent weeks, but for the most part these have been confined locally and settled quietly and quickly. The big news of the month was the decision to launch a number of new tire factories as soon as possible, an indication that military heads are anticipating a much longer European war than previously indicated.

According to Paul V. McNutt, Chairman of the War Manpower Commission, in a statement issued on December 17, there is an immediate critical need for approximately 2,300 workers for military tire production and an additional 8,500 workers will be needed for the next few months as production facilities are expanded. To meet these needs, a top priority rating has been granted to the rubber tire industry, and where manpower is not available locally a top priority in inter-regional recruitment will be approved.

Eight Measures Being Taken

Pointing out that the urgency of the military tire program is now second only to a few secret projects on the "must" production list, the WMC chief said that eight specific measures were being taken to increase tire production immediately, these being as follows:

1. Institution of a seven-day work week for a 120-day period.
2. All-out effort by members of the United Rubber Workers of America (CIO) to produce military tires, with a moratorium on labor-management differences over wage changes and job classifications.
3. Top manpower priorities.
4. Authorization by the Army for the furlough of 1,200 former tire worers to return to tire plants.
5. More efficient utilization of available workers and existing facilities.
6. The use of new tire facilities now nearing completion. (This does not include the new tire expansion program announced December 13.)
7. Re-activation of special Army manpower recruiting teams for the tire industry.
8. A War Production Board study to determine whether passenger tire production can be cut, thus releasing manpower and facilities for the military tire production program.

In conection with the tire manpower need, Mr. McNutt pointed out that laborers, maintenance workers and other unskilled workers constitute the bulk of the need, and that tire production jobs are not confined to men and many women are needed. He said that this was especially true for tire plants in Los Angeles and Chicopee Falls, Mass., the greatest immediate need for workers being in these plants and in the Akron plants.

Tire plants throughout the country have generally returned to the seven-day week as part of the emergency program, return to such full work-weeks being made possible by adjustments in production schedules. Because it is not yet known what the effect of the seven-day week will have on absenteeism, no estimate as to the production man-hour increase from reinstitution of such a work-week can yet be made. A substantial net tire production increase is expected, even though a slight increase in absenteeism may result. A sub-committee of WMC is preparing a $50,000 anti-absenteeism campaign in the tire field.

Difficulty Met in Some States

Some difficulty is reported being met in certain states with regard to the seven-day work week in tire plants. California, for instance, has existing legislation which prohibits more than 13 straight working days, while Massachusetts does not normally permit plants to operate on Sundays. It is expected that special permission will be granted in such states to enable tire workers to put in a full seven days, but nothing definite has been learned at this writing.

On December 30, Lt. Gen. Somervell, Chief of the Army Service Forces, announced that the Army will present official certificates of commendation to tire workers who maintain perfect attendance records during the emergency period from January 1 to April 30. Tire manufacturers were urged to fully publicize this announcement to their workers.

According to latest reports, the Army will furlough approximately 1,200 men with rubber experience to help meet the manpower need. Service commands throughout the country are carefully processing their personnel files to locate men with experience in tire production or associated work. These men are being furloughed for 90 days and will be subject to Army regulation, remaining in uniform except during work hours. They will include some men whose furloughs have been specifically requested by former employers.

Krug Lists Materials Needed

Figures on the materials needed for production of tires, tubes and other rubber goods, including exports, for the first quarter of 1945, were issued by J. A. Krug, WPB Chairman, on December 29. The figures include materials needed to produce tires and tubes in accordance with estimates submitted by the tire industry, these estimates assuming that necessary additional labor will be furnished and that additional facilities will be provided to remove existing bottlenecks.

According to Mr. Krug, demand for synthetic rubber for the first quarter can be met with existing facilities except in the case of Butyl rubber, production of which has lagged behind rated capacity because of the complexity of the manufacturing process. Natural rubber requirements for the period will total 36,400 long tons and it is considered unlikely that imports will match this figure, even though the first quarter of the year is usually the period of largest arrivals.

The situation in carbon black will be tight and the inadequate supply of Easy Processing Channel and High-Modulus Furnace types will have to be balanced by the use of less desirable furnace blacks. Whereas 107,235,000 lbs. of channel black and 84,354,000 lbs. of furnace black were consumed in the last quarter of 1944, it is estimated that 133,000,000 lbs. of channel black and 101,480,000 lbs. of furnace black will be required for processing in the first quarter of 1945.

The situation in high tenacity rayon cord, Mr. Krug stated, will probably remain the most serious bottleneck in the tire program. The rayon industry, he said, will fall short of many essential

material needs in the first quarter of 1945 by 19,100,000 lbs., and plans are being made to expand production in the subsequent quarter. It is estimated that 48,600,000 lbs. of rayon (which is the maximum estimated production capacity of the rayon industry) and 57,700,000 lbs. of cotton will be needed for tire cord and fabric in the 1945 quarter. The demand for cotton tire cord for smaller truck tires, jeep tires and passenger car tires runs head-on into the military demand for duck for use in tentage and heavy canvas tarpaulins.

Carbon Black Situation

In view of increased requirements for carbon black in heavy duty tire production, as outlined above, WPB announced on January 10 that closer control will be exercised over allocation and use of such black.

Beginning with requests for February allocations, the terms of Order M-300, Schedule 32, which established allocation control over carbon black, must be complied with strictly, officials of WPB's Chemicals Bureau said. The end use breakdown must be given for the various carbon blacks for which allocation request is made. Specifically, the war and civilian code numbers designated opposite the end use classifications in paragraph (e) of the order must be given, showing the quantities of carbon black required for each such code number designation.

It is important also that Table II of Customer's Application Form WPB-2945 be properly filled out to show receipts, disposition and stocks of the various carbon blacks by type, WPB said. These requirements apply to requests for both domestic and foreign shipments.

The scheduled dates for the filing of both the supplier's WPB-2947 and the customer's WPB-2945 forms also should be complied with strictly. Form WPB-2947 is due the 20th of the month preceding the proposed delivery month, while Form WPB-2945 is due on the 15th of the preceding month. Failure to comply with any of the terms of the order in preparing applications will result in return of the forms to applicants without action.

A few days later, WPB announced that plans are being formulated to increase production of carbon black by 175,000,000 lbs. a year in order to meet the expanded tire program. Production of carbon black in 1944, it was said, averaged 35,000,000 lbs. per month. Since new facilities will have to be constructed, no substantial increase in the production of carbon black will be possible until the latter part of 1945 or early in 1946 and carbon black users will probably be required to change over to other types of black whenever possible.

In connection with the announcement of new production facilities for carbon black, WPB pointed out that since the entrance of the United States into the war carbon black manufacturers have increased production of channel black alone by at least 175,000,000 lbs. per year and increases previously authorized were sufficient to meet requirements as scheduled a few months ago, but the new 25% increase in the heavy duty tire program necessitates increasing such production another 175,000,000 lbs. per year.

In order to increase production of channel black, new supplies of natural gas must be found. At the present time, a survey is being made to seek out all supplies of natural gas that may be used. About 375,000,000 cubic feet of gas per day will be required for the increased production, it was explained. Chemical Bureau officials said that sour and waste gas are utilized as far as possible in the production of channel black.

It is expected that a number of plants will be built by the government at points where sufficient natural gas is available. Since supplies of the gas have been found in the past to be more abundant in the southwestern portion of the United States, the new plants probably will be located in that area.

Another problem that the increased need for channel black will entail is the finding of sufficient manpower. Plants now in operation are hampered by the lack of manpower and those now under construction are not being completed on schedule, also because of the manpower shortage. Almost all carbon black facilities are operating without their full manpower requirements, and many more workers will be needed to operate the plants that must be built.

Situation in Tire Cord

As pointed out by WPB Chairman Krug, high tenacity rayon cord is one of the worst immediate bottlenecks. So serious is the tire cord situation that at the turn of the year Firestone announced that tire production both in its Akron and Memphis, Tenn., plants was suspended for a day or two.

To help ease the fabric shortage which threatens to interrupt the emergency tire production drive, Gen. Somervell announced on January 4 that the Army will furlough 1,000 soldiers for work in textile plants turning out tire fabric. These men, who are not to be confused with those being furloughed to work in the tire plants themselves, will be divided among approximately 25 textile plants, including those owned and operated by some of the tire manufacturers. It was also announced that Firestone had been authorized to use the full output of its fabric mills for tire production.

Special authorization was necessary in the case of Firestone since under a directive of the WPB Textile Bureau rubber manufacturers operating their own textile plants have been forced to divert 20% of their production to cotton duck for tents and other uses. Since almost all other tire companies are as badly in need of fabric as is Firestone, the probability is that authorization to use the full output of their own textile plants will be granted to other tire manufacturers.

It was also learned during the month that production of rayon tire cord had been started in the new $2,240,000 government plant at Scottsville, Va., which is being operated by the U. S. Rubber Company. This mill, when in full operation, will have an annual capacity of 12,000,000 lbs. of twisted rayon tire cord, and although only 180 people are currently employed it is expected that the number will be increased to 300 shortly.

It was also announced that cord twisting machinery and looms for weaving rayon tire cord fabric have been installed in the Lewistown, Penna., and Parkersburg, W. Va., plants of the American Viscose Corporation. Initial production of high tenacity rayon tire yarn has also been begun at the new unit at the Front Royal, Va., plant operated by this company. This new unit will produce approximately 57,000,000 lbs. of rayon tire yarn annually when in full production

Plan New Tire Plants

Calling tires the most critical of all war programs at present, WPB announced on December 13 that new tire factories will be constructed in an effort to meet the huge demand of the Army. New tire plants plus the emergency steps outlined above are expected to bring production of military type tires up to an estimated 6,700,000 quarterly by the end of the current year.

At the time of the announcement it had not been decided where the new plants would be located, but it was emphasized that the labor situation would be a determining factor in placing them. The cost of the plants was estimated at $40,000,000 to $50,000,000, but in other quarters it was said that the cost might run considerably over or under such an estimate depending on a number of factors including size and type of facilities. It was also stated that if suitable buildings can be found, they will be diverted from less urgent war programs to the manufacture of tires but otherwise entirely new plants will be built.

In this connection it is interesting to note that on January 3 WPB announced that a factory at Pottstown, Penna., believed to be ideally suited for the production of tires, has been released by the Army Air Forces to permit the manufacture of tires. This plant, which will be operated for the government by the Firestone Tire & Rubber Co., will promptly be converted to tire production and is expected to start such production by March of this year. The Pottstown plant formerly produced large airplane engines and was operated for the government by the Jacobs Engine Co.

Sufficient supplies of both natural and synthetic rubber are expected to be available to meet the increased heavy duty tire production schedules when the new plants are built, but it will probably be necessary to still further increase the supply of rayon cord. This new plant program is entirely separate from and in addition to the $70,000,000-odd expansion program put into effect by the rubber industry more than a year ago.

An encouraging note on the over-all tire situation was expressed by WPB Chairman Krug on January 4 when he stated that the program for expanded tire production had received excellent response from the tire manufacturers and that such manufacturers, solicited by WPB several months ago for methods to increase production of military type tires by 6,000,000 a year, "oversubscribed" the quotas needed by more than 50%. The industry is reported to have submitted figures showing a potential expansion of 36,000 tires a day although WPB had asked for an increase of only 20,000 tires a day.

Mr. Krug revealed that allocations of the enlarged tire program had been distributed among the tire manufacturers and that, on the basis of a need for 21,300 tires a day, and a slightly larger volume of tubes, four companies had been authorized to provide about half of the expansion. Firestone, Goodyear and U. S. Rubber are expected to expand output of heavy-duty military-type tires approximately 3,000 units a day and Goodrich about 2,000 a day. The rest of the increase is being divided up among the smaller plants which will step up production from 50 to 1,000 tires a day.

A spoke in the management-labor relations was thrown by C. V. Wheeler, president of the Goodyear Local of the U.R.W.A., in a letter sent to Washington officials and made public on December 28, charging that Goodyear could produce 5,000 more tires daily in Akron Plant 2 with better material supply and scheduling. The letter requested "the immediate investigation of this matter."

Goodyear officials stated that they welcomed any inquiry into the subject by a fair and competent authority and suggested that the scope of any inquiry be broadened "to include the degree of responsibility Wheeler should assume for the parade of sit-downs, slow-downs and work stoppages which in the month of November lost 15,000 man-hours of production and a large number of military tires." An investigation of the charges is currently under way.

A situation unique in union history has developed at the plant of the U. S. Rubber Company in Detroit where approximately 500 members of the U.R.W.A. face potential loss of their jobs for violation of the union's no-strike pledge. These workers participated in a wild-cat strike last October and were fined $12.50 each by U.R.W.A. headquarters. Those refusing to pay the fine were automatically expelled from union membership.

It is understood that a list of these men is being checked by the rubber union and the list will then be certified to U. S. Rubber as "no longer members of the union." This action would mean loss of jobs for those certified. In view of the current need for tire workers, the situation assumes a perplexing aspect.

On January 12, the Military Committee of the House of Representatives was asked to investigate reports that service men furloughed from the Army to work in tire plants are being required to join labor unions and further that such men are being instructed by union officials not to exceed a certain rate of output alleged to be "about 75% of what a man can do."

SEVERAL DIRECTIVES TO RUBBER ORDER R-1 ARE ISSUED BY WPB

A number of directives, or directions as they are officially termed, have been issued by WPB in recent weeks, all of them pertaining to Rubber Order R-1. These included the following:

Direction 4, issued on December 14, specifies that each manufacturer of conveyor belting and roll lot transmission belting shall ship at least 40% but not more than 75% by tonnage of his monthly production of such belting to fill government orders, including direct orders placed by the British Purchasing Commission. Any manufacturer of such belting who is able to devote more than 75% of his facilities to fill government orders, without interference with shipments for essential civilian use, may communicate with the Rubber Bureau so that an appropriate adjustment of his shipping schedules can be made.

Direction 5, issued on December 13, changes the order of preference of product groups on List 32 of the order. This list covers "Regulations for the Use of High Tenacity Rayon Cord." Under the direction, the order of preference of Groups 1 through 12 remains unchanged, but the order of preference Groups 14 and 16 become respectively 13 and 14, Group 15 remains unchanged, and Group 13 becomes 16. All other provisions on List 32 remain unchanged.

Direction 6, issued on December 11, removes all types of Buna N (including GR-A), Hycar O.S., and Styraloy from allocation control. It is no longer necessary to apply on Form WPB-3662 for authorization to consume these materials in the manufacture of products permitted by the rubber order or to file purchase requests on Form WPB-3682 for any GR synthetics included in these materials. Deliveries of the materials may be made without restriction for uses permitted in the rubber order, provided such deliveries and transfers are reported as shipments or receipts on Form WPB-3410 for the calendar month in which the transactions occur.

Direction 7, issued on December 27, states that after January 1, crude rubber and latex may be consumed only in valves, valve adhesion pads, splicing gum strips and cements, and identification inks and cements for tubes used in city and inter-city bus mileage contract tires of cross sections 10.00 and larger. Such consumption is allowed notwithstanding the provisions of paragraph (a) (3) of List 25 of the rubber order, entitled "Regulations for the Manufacture of Tire Tubes (Except Airplane and Bicycle Tubes)."

Direction 8, issued on December 27, changes the compound designation of standard highway tires, size 7.50-16, to S-4, and rock service tires, size 21.00-24, to S-7, and changes the maximum content of crude rubber which may be used in the production of such tires.

Direction 9, issued on January 9, permits the use of Butyl rubber in the manufacture of tubes for light trucks after January 15. The regulation applies to tubes for both government and civilian use in sizes 6.00-17, 6.00-20, 6.50-17, and 6.50-20. Previously, Butyl was permitted for tubes only in very large truck and bus sizes, down through and including 7.00 cross section.

Other government regulations affecting the rubber manufacturing industry included the following:

FOOTWEAR

Amendment No. 1 to R.M.P.R. 229 (Retail & Wholesale Prices for Certain Rubber Footwear), issued by OPA on December 26 and effective January 1, provides two methods so that ceilings for all types of rubber footwear can be established for those wholesalers who cannot determine their maximum prices under existing pricing provisions.

The same amendment set retail ceiling prices for canvas-topped rubber-soled shoes made in Cuba of natural rubber and imported into the United States by retailers, and for purposes of clarity expressly provided that rubber footwear not specifically covered by the rubber footwear regulation come under the General Maximum Price Regulation, which means that ceilings will be at the seller's or nearest competitor's highest prices in March, 1942.

The two methods for establishing ceiling prices are:

1. For wholesalers who did not sell rubber footwear between April 1 and October 25, 1941, and hence did not have any discounts in effect during that period, OPA will determine, on written application to the Washington, D. C. office, what discounts, allowances or other deductions shall be applied against the listed wholesale dollar-and-cent ceilings.

2. It is specifically stated that OPA may, by order, adjust a wholesaler's discounts to make them consistent with those of other wholesalers. Under this provision an order could be issued, for instance, adjusting the ceilings of wholesalers who did not follow the customary practice of using manufacturers' list prices and selling at discounts off those prices.

A minor change in the rubber footwear rationing regulations was also announced by OPA on January 5. Under the terms of Amendment No. 15 to Ration Order 6A (Men's Rubber Boots and

Rubber Work Shoes), "seconds" of below-knee height heavyweight boots (Type 3) may be classed and sold as below-knee height lightweight boots (Type 4). The reclassifications must be reported to OPA by dealers and manufacturers. The action affects only those Type 3 boots that are imperfect and have therefore been identified by the manufacturers as "seconds" either by branding the word on each boot or by punching a small hole in the upper part of each, according to customary trade practice.

MECHANICAL GOODS

Manufacturers of seven groups of rubber products may no longer adjust their own maximum prices of such products under the terms of Amendment No. 1 to Order No. 41 under M.P.R. 149 (Mechanical Rubber Goods), issued by OPA on December 26. The seven groups of products are: Brake linings and clutch facings; flooring, mats and matting; foamed latex products; hard rubber goods; oil well specialities; rubber-covered rolls; and sponge rubber goods.

Under the previous authority, effective November 18, 1944, manufacturers who substituted Buna S for natural rubber in molded and extruded mechanical rubber goods not listed in Appendix A of the mechanical goods regulation were allowed to adjust their maximum prices on these products to equal current factory costs plus cash discount.

RECLAIMED RUBBER

An additional increase of ¼ of a cent a pound in manufacturers' maximum prices of reclaimed rubber was announced by OPA on January 11. The increase is also permitted on charges for the service of processing scrap rubber finished by the buyer into reclaimed rubber.

The action, covered by Amendment No. 6 to R.P.S. 56 (Reclaimed Rubber) and Amendment No. 1 to Supplementary Service Regulation No. 35 to R.M.P.R. 165 (Services), both effective January 15, was taken to restore the normal earnings position of rubber reclaimers which have had increases in costs during the third quarter of 1944. The increase authorized is the minimum required by law.

Because reclaimed rubber represents but a small part of the cost of finished products, the increases in prices granted will not generally result in higher prices of the commodities into which it goes, according to OPA.

SUBSTITUTE RUBBER

An amendment designed to tighten control of the pricing of synthetic resins and plastic materials and substitute rubbers not marketed during March, 1942, the base price date of the regulation covering these commodities, was announced by OPA on January 9. Effective January 13, Amendment No. 7 to M.P.R. 406 (Synthetic Resins and Plastic Materials and Substitute Rubber) specifically states that prices reported, proposed or established for items not marketed during the base period may be reviewed, revised or revoked by OPA at any time.

Previously, the right of OPA to revise such prices during the period 20 to 120 days after filing, or at any time later than six months after filing, was not clear. OPA may now act at any time, if necessary, to bring prices for the new items in line with those for similar commodities priced at March, 1942, levels under other provisions of the regulation.

MISCELLANEOUS ORDERS

In addition to the foregoing, the following regulations of interest to the rubber industry were also issued in recent weeks:

Potassium carbonate has been placed under allocation control of Schedule 85 of the general chemicals allocation order (M-300). The action was taken because of new direct military requirements and increases in existing military needs for the material.

Acrylonitrile, used chiefly in the production of Buna N, has been removed from allocation control and Schedule 56 of Order M-300, covering such allocation, has been revoked. Supply is now in excess of requirements.

Dipentene, stabilized rosins, heat-treated rosins, polymerized rosins and metal resinates have all been placed under Order M-340 (Miscellaneous Chemicals). An amendment to that order has eliminated allocation control of the chemicals under the order in an effort to simplify controls and save paper work.

Under the terms of a recent amendment to Conservation Order M-286, certain protective papers, including glassine, grease-proof and vegetable parchment papers, may now be used for packaging rubber and rubber goods, tobacco and tobacco products, etc.

Order M-363, covering the allocation of carbon tetrachloride, has been revoked and that material has been placed under Schedule 78 of Order M-300, the general chemicals allocation order.

COMMITTEE RECOMMENDS CONTINUED EXPERIMENTS WITH GUAYULE

The special sub-committee of the House of Representatives, which is headed by W. R. Poage, of Texas, and which has been investigating the entire guayule situation, submitted its report to the Speaker of the House on January 2. The committee recommended that the government withdraw from the production of guayule but continue experiments in growing and processing of the rubber-bearing plant. It further recommended that no existing guayule rubber plantings be destroyed as long as the war continues and sources of natural rubber in the Far East are not available.

In its report, the committee expressed a conviction that guayule might be produced profitably in the United States and suggested that in order to establish a sound post-war industry in private hands the government establish and guarantee for a period of from 7 to 10 years a definite floor under the price of domestically produced guayule. This floor, according to the committee, "should be somewhere between 20 and 50 cents a pound of rubber content . . . and probably should be fixed at the established price of 28 cents a pound." (EDITOR'S NOTE: The United States is now buying guayule from Mexico at 28 cents a pound). The floor should apply only to a definite acreage, it was suggested, so as to prevent any undue drain on the Treasury "if the cost of production is reduced as low as we hope it may by quantity production."

The report also contained the observation that in 1930 General Dwight D. Eisenhower, then a major, investigated the possibilities of guayule production in the United States in connection with a War Department study of vital materials, and had suggested that 400,000 acres be devoted to its cultivation in the southwest. Agreeing that 400,000 acres (approximately 13 times present acreage) might be advisable for a limit to subsidized production, the committee added that the acreage on which any one farmer could receive the guaranty should be limited to possibly 160 acres in order to spread cultivation of guayule into numerous hands. Pointing out that larger operators may be able to produce guayule without any guaranty, the committee added "we do not want to encourage farmers to depend on guayule alone . . . we want to encourage diversified farming, not a new 'one-crop' system."

With regard to the results obtained from guayule rubber, the report made mention of the fact that the B. F. Goodrich Co. had advised the War Production Board on November 21, 1944, that "guayule is satisfactory as a 100 percent replacement for other rubber in the outer carcass plies of heavy-duty, S-4 tires."

Commenting on the committee's recommendations, a spokesman for the General Tire & Rubber Co., one of the foremost proponents of guayule rubber in this country, said that the floor favored by the committee was much too low. Referring to the suggested 28-cent floor, he pointed out that wage standards in Mexico are much lower than in the United States. A higher price on the product at this time, he said, would greatly encourage growth in the United States, with the probable result that the price eventually would be brought down to 20 cents a pound.

Other Crude Rubber Events

Other news in the crude rubber field in recent weeks included the admission made at the American Platform Conference of Lecturers on International Af-

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fairs, held at the State Department in Washington, D. C., on December 27, that the United States has neither made nor contemplates making any commitment on rubber so far as an international rubber convention is concerned. The rubber situation was described as being much too complicated, with too many fluctuating factors, for any definite agreements to be arrived at now for post-war control.

The reference to the "international rubber convention" covered the meeting scheduled to be held sometime in January between American, British and Dutch representatives appointed by their respective governments to discuss the over-all rubber situation. It has already been stated that these discussions, which originated in London last July, are rather informal in nature and are not intended to bind the governments involved. The January meeting, it was understood, will include a factual report on the current situation. The American delegation is expected to present an appraisal of the situation in terms of supply after the war.

From the Rubber Development Corporation came a report that rubber imports from the Amazon countries of South America are increasing. According to the report, shipments from such countries for the first eight months of 1944 totaled 13,684 tons, compared with 12,990 tons for the full year of 1943, and 5,872 tons for 1942. Production in the Amazon Valley is said to have been stimulated by an inflow of additional labor, by improvement of transportation, and by higher prices.

The RDC report states that 18,800 laborers had been moved into the Amazon region up to August 31, 1944, under a special arrangement with the Brazilian government. In addition, 14,484, including 7,435 men, moved as families into the area under another cooperative arrangement. In Central America and other parts of South America, the report adds, upwards of 3,000 laborers have been moved into rubber-producing areas.

Late in December, a decree was issued in Rio de Janeiro authorizing Brazilian manufacturers to use American-made synthetic rubber, thus sweeping aside the traditional barrier against the use of imported rubber. The decree will have the effect of increasing Brazilian crude rubber shipments to the United States perhaps as much as 15 percent.

Dutch Are Making Plans

According to Dr. Pieter Honig, one of the foremost rubber executives of the Netherlands East Indies Government, purchasing agents of that government and independently-operated Dutch concerns are planning to spend approximately $800,000,000 in the United States for industrial equipment to rebuild their island empire when it is finally recaptured from the Japanese. Dr. Honig issued his statement in San Francisco.

The expenditure to be made in the United States, the Dutch executive inferred, represents only a third of the $2,400,000,000 which colony officials expect it will cost to carry out a five-year rehabilitation and reconstruction program. Orders for some $15,000,000 of rubber-producing equipment have already been placed in keeping with this program, he said.

Dr. Honig stressed the importance of rubber growing activities in the Netherlands East Indies from the standpoint of the population. He stated that about 7,000,000 people, or approximately 10% of the total population, make at least a part-time living from the six to seven million acres of rubber plantations in the Indies. Admitting that synthetic rubber is a "marvellous substitute," Dr. Honig indicated that the Dutch expect a good market for five or six years at least, pointing out that "there is a backlog replacement demand in the United States for 500,000 tons of natural rubber for automobile tires alone."

Officials of the East Indies, Dr. Honig continued, hope to be shipping smoked rubber sheets within three months after the islands are liberated. Although production was rigidly controlled before the war by the International Rubber Regulation Committee, he predicted that free production will be permitted for two or three years after the war.

TEMPORARY INCREASES IN CIVILIAN TIRES CONTINUED TO APRIL 15

Under the terms of Amendment No. 3 to R.M.P.R. 143 (Wholesale Prices for New Rubber Tires and Tubes), which became effective December 15, all temporary increases in manufacturers' and brand owners' ceiling prices for civilian replacement tires, which were to have expired on December 15, 1944, will be continued in effect until April 15, 1945. These temporary increases are 8.9% of the maximum retail price on passenger car and motorcycle tires and 6.5% on all truck and bus and certain special service type tires.

The action, which stirred a storm of controversy in certain quarters, was taken by OPA in compliance with a directive issued by James F. Byrnes, Director of War Mobilization and Reconversion. In issuing the directive, Mr. Byrnes stated that the government is asking the tire companies to expand production facilities involving expensive changes to meet the present critical shortage in tires for our fighting forces and that the temporary increases for civilian tires be continued until the demand for the heavy-duty tires is met but in any case no later than April 15.

In connection with this extension of the rollback of prices of civilian tires, Drew Pearson, noted columnist, charged that the tire manufacturers had exerted pressure on Washington officials to extend the temporary price increases as payment of sorts for their all-out attempt to meet the new demand for heavy-duty tires for the Army. Tire officials refused to comment on the charges, stating that any answer to Pearson should come from Mr. Byrnes. The contemplated reductions were said to have been based on extensive studies by OPA of cost and earnings data. The temporary increases originally granted were due to lack of cost experience in the industry with synthetic rubber and other relatively new materials. In issuing the directive which led to the price extension, Mr. Byrnes overruled OPA.

January Quotas Reduced

As anticipated, January tire quotas were sharply reduced from December in several categories. The quota of new passenger car tires was cut from 2,000,000 in December to 1,800,000, while a particularly severe cut was made in small truck and bus tires, the January quota being 216,000, a drop of 64,000 from the December quota of 280,000.

In the heavy truck and bus tire group, where a backlog of 100,000 high-priority applications still remains unfilled for lack of quota, the January quota was set at 110,000, down 10,000 from the previous month. Tractor-implement tire quotas remain unchanged at 50,000 for size 7.50 and smaller and 20,000 for sizes larger than 7.50.

Foreshadowing the reduction in January tire quotas was the statement made in Washington on December 25 by James F. Clark, director of the WPB Rubber Bureau, to the effect that the demand for military tires had forced a re-examination of the civilian tire program for the first quarter of 1945. He said that only 5,000,000 passenger car tires for civilians would be produced under the new program, compared with the 8,000,000 originally planned and the 6,650,000 which were produced in the last quarter of 1944.

The curtailment was necessary, according to Mr. Clark, so that more manpower and facilities could be concentrated on the military-type tires, particularly the sizes used on two-ton Army trucks. A step in this direction was made by an amendment to Appendix III of Rubber Order R-1 on December 23 which restricts the consumption of cotton tire cord and fabric in the production of passenger, motorcycle and bicycle tires. The amendment provides that no manufacturer of such tires shall consume any cotton in their production except as specifically authorized by the War Production Board.

Col. J. Monroe Johnson, director of the Office of Defense Transportation, reported on December 17 that as claimant agency for essential commercial vehicle transportation the ODT had originally requested 2,241,889 tires for new vehicle and replacement purposes for the first quarter of the current year.

UNITED ENGINEERING & FOUNDRY BUYS ADAMSON MACHINE CO.; DAWES, HALE AND LANG ARE NAMED OFFICERS OF NEW CONCERN

F. L. Dawes

Andrew Hale

Acquisition of the Adamson Machine Co., of Akron, one of the oldest and largest manufacturers of rubber and allied machinery, was announced by the United Engineering & Foundry Co., of Pittsburgh, Penna., on December 28. The sale is reported to have involved approximately $1,500,000, which covers plant cost and will provide some enlargement. Adamson will continue in operation as a subsidiary of United Engineering under the name of the Adamson United Co.

F. L. Dawes, general manager of the Adamson concern for the past several years, has been named president and general manager of the new Adamson United Co., and Andrew Hale, long associated with the Farrel-Birmingham Co. as midwest sales representative, becomes vice-president in charge of sales. George Lang, secretary-treasurer of United Engineering, will act in a similar capacity for that firm's new subsidiary. George Fenn, who was one of the larger stockholders of Adamson, will be assistant secretary-treasurer of Adamson United.

Directors of the new company include Messrs. Dawes, Hale and Lang, and K. C. Gardner, president of United Engineering; F. C. Biggert, chairman, and John Quinn, manager, of the United Engineering plant at Canton, Ohio; and Harry M. Naugle, of Canton, widely known for pioneering the continuous strip mill for steel production.

Both United Engineering and Adamson Machine are well known in their respective fields. The former is recognized as one of the world's largest designers and manufacturers of rolls and rolling mill equipment, and operates plants at Canton and Youngstown, Ohio, and Pittsburgh and Vandergrift, Penna. It also operates one of the largest combination steel foundry and machine shops in existence for the government at New Castle, Penna. Adamson Machine, which was founded in 1890 by the late Alexander Adamson, pioneered and developed much heavy machinery and equipment for the rubber industry, including vulcanizers, tire molds and presses.

It has been pointed out that the transaction places the Adamson concern in an advantageous position because of the new facilities available through United Engineering from the standpoint of cooperation with the rubber industry in the development of new machine processes and in servicing present ones.

Two New Coating Materials

Two new resinous coating compositions, one a solvent solution and the other a water emulsion, called Coflex Solution-521 and Coflex Emulsion-521, respectively, both designed to replace crude rubber and latex for dry seal adhesive purposes, were recently introduced by the Industrial Chemical Division of the American Bandage Corp., 325 W. Ohio St., Chicago 10, Ill. Both materials can be applied to almost any kind of surface, including paper, cloth, glass, metals, cellophane and other cellulosic products. When applied to such surfaces, they dry and form elastic transparent films which are said to be strongly self-adhering. Films deposited from the composition retain their self-adhering properties almost indefinitely. The emulsion can be diluted simply by the addition of water, while the solution can be diluted with acetone, ethyl, butyl or amyl acetate, toluene, benzene, etc.

BARUCH RECOMMENDATIONS COMPARED WITH REGULATIONS

A Washington correspondent for one of the leading daily newspapers recently made a check-up of the proposals contained in the Baruch Rubber Report and subsequent actions on the part of the various government agencies. The comparisons follow:

1. The Baruch Report called for no speeds over 35 miles an hour. This has been maintained for passenger cars, but has been relaxed for trucks carrying priority cargoes.
2. Recommended national restrictions on mileage and gas rationing were imposed on a 5000 miles per car per year basis. They were further cut in the East because of a gasoline shortage.
3. Compulsory periodic tire inspection was instituted, but was abandoned in 1944 because it was found unnecessary and a nuisance.
4. Recommended release of more rubber to civilians for tires and recapping, to maintain essential civilian driving, has been possible to a degree, but the tire bottleneck is a shortage of manpower.
5. The Baruch Report recommended expansion of the production of Thiokol to 60,000 tons a year, for use in retreads. This entire program has been dropped after making 750 tons in 1943—because the material was not needed.
6. As recommended, a mission was sent to Moscow to learn how the Russians made synthetic rubber, but it learned little not already known.
7. Production of an additional 100,000 tons of butadiene a year was recommended, and the Rubber Director authorized 12 additional refinery conversion projects with a total capacity of 140,000 tons a year. Later, he canceled eight of them with a capacity of 105,000 tons because they were not needed.
8. Construction of facilities to produce an additional 140,000 tons of Buna S rubber was recommended. This was not carried out because plants previously authorized were found able to produce at over 120 per cent capacity.
9. Making of 30,000 additional tons of Buna S from grain was recommended, but never ordered by the Rubber Director.
10. Increase of neoprene production capacity by 20,000 tons a year was recommended. The Rubber Director ordered this in November, 1942, canceled it in February, 1943 and reordered it April, 1944.

Officers of Committee D-11

At the recent annual meeting of the American Society for Testing Materials, held in New York City, Simon Collier (Johns-Manville) was elected chairman, and H. E. Outcault (St. Joseph Lead) vice-chairman of Committee D-11 on Rubber Products. Arthur W. Carpenter (Goodrich) was re-elected as secretary.

OUTCAULT AND WYROUGH HEAD NEW YORK RUBBER GROUP

The election of officers which was one of the features of the Annual Meeting and Christmas Party of the New York Rubber Group, held on December 15 at the Building Trades Club in New York City, resulted as follows: *Chairman,* Harry Outcault (St. Joseph Lead); *Vice-Chairman,* George J. Wyrough (Whitehead Bros. Rubber); *Sergeant-at-Arms,* Carl A. Meyer (Barrett); *Secretary-Treasurer,* B. B. Wilson *(India Rubber World).* P. P. Murawski (DuPont), J. E. Waters (General Cable) and A. P. Stubbs (Manhattan Rubber) were elected members of the Executive Committee. The Nominating Committee consisted of J. H. Ingmanson (Whitney Blake), chairman, Fred Traflet (Pequanoc Rubber) and Ken Soule (Manhattan Rubber).

The meeting was attended by approximately 450 members and guests and, as usual for this annual party, was devoted entirely to fun and frolic. After the brief business session, during which Peter P. Pinto (RUBBER AGE), the retiring secretary-treasurer, announced that the paid membership of the group had reached 668, the largest in its history, a special program of entertainment was presented, featuring several novelty acts, following which prizes were distributed to holders of lucky number tickets. These prizes, some 90 in all, were made possible by donations received from the following concerns:

Advance Solvents & Chemical Corp., Akron Standard Mold Co., L. Albert & Son, American Cyanamid & Chemical Corp., American Resinous Chemicals Corp., American Zinc Sales Co., Anaconda Sales Co., J. T. Baker Chemical Co., Barrett Division, Binney & Smith Co., Godfrey L. Cabot, Inc., Callaway Mills, Carter Bell Mfg. Co., Cleveland Liner & Mfg. Co., Container Co., Curran & Barry, DuPont, Farrel-Birmingham Co., General Atlas Carbon, General Latex & Chemical Corp., R. W. Greeff & Co., C. P. Hall Co., Herron Bros. & Meyer, J. M. Huber, Inc., Hycar Chemical Co., *India Rubber World,* I. B. Kleinert Rubber Co., Loewenthal Co., Midwest Rubber Reclaiming Co., Monsanto Chemical Co., Moore & Munger, H. Muehlstein & Co.

Also National Rubber Machinery Co., National Sherardizing & Machine Co., Naugatuck Chemical, N. J. Zinc Co., Pequanoc Rubber Co., Philadelphia Rubber Works, Phillips Petroleum Co., Precision Scientific Co., Rare Metal Products Co., Revertex Corp. of America, H. M. Royal, Inc., RUBBER AGE, St. Joseph Lead Co., A. Schrader's Son, A. Schulman, Inc., Henry L. Scott Co., Sharples Chemicals, Inc., Shell Oil Co., Speed Products Co., Stamford Rubber Supply Co., Stanco Distributors, Inc., Standard Chemical Co., Stauffer Chemical Co., Sun Oil Co.

Also Tanney-Costello Co., Textile Proofers, Inc., Thiokol Corp., Thompson, Weinman & Co., Wm. R. Thropp & Sons Co., Titanium Pigment Corp., United Carbon Co., U. S. Rubber Reclaiming Co., R. T. Vanderbilt Co., Vansul & Co., C. K. Williams & Co., Wilmington Chemical Corp., and Witco Chemical Co.

Coming Events

Feb. 2. Chicago Rubber Group, Morrison Hotel, Chicago, Ill.

Feb. 6. Los Angeles Rubber Group, Hotel Mayfair, Los Angeles, Cal.

Feb. 9. Montreal Rubber & Plastics Group, Ritz-Carlton Hotel, Montreal.

Feb. 16. Akron Rubber Group, Mayflower Hotel, Akron, Ohio.

Feb. 19. Metropolitan Section, Rubber & Plastics Division, A.S.M.E., Auditorium, Engineering Societies Bldg., New York, N. Y.

Feb. 28. A.S.T.M. Spring Meeting, Hotel William Penn, Pittsburgh, Pa.

Mar. 19-21. N.A.W.M.D., War Conference, Hotel Sherman, Chicago, Ill.

June 18-22. A.S.T.M. Annual Meeting, Hotel Statler, Buffalo, N. Y.

Sept. 10-14. American Chemical Society, Annual Meeting, Chicago, Ill.

Riesing Will Address Group

E. F. Riesing, chief automotive engineer of the Firestone Industrial Products Co., Detroit, Mich., will discuss "Synthetic Rubber in Automotive Chassis—Status and Future Possibilities" at a special meeting of the Metropolitan Section, Rubber & Plastics Division, American Society of Mechanical Engineers, to be held on Monday, February 19, at 7:30 P.M., in the auditorium of the Engineering Societies Building, 29 West 39th St., New York City. Mr. Riesing will stress the advantageous properties and applications of synthetic rubber and will illustrate principles pertinent to automotive engineering which are applicable to the full range of mechanical engineering. The talk will be dramatized with an extensive array of dynamic tests and models especially prepared for the presentation. J. W. Devorss, Jr., of the New Products Division, U. S. Rubber Co., will be in charge of the meeting.

Cancel Division Meeting

Following the example of the parent society, which has cancelled the general meeting scheduled to be held in the Spring, as reported elsewhere in this issue, the Executive Committee of the Division of Rubber Chemistry, A.C.S., has also decided not to hold the customary Spring Meeting of that Division.

NORTHERN CALIFORNIA HOLDS ITS ANNUAL CHRISTMAS PARTY

The Orinda Hacienda, Orinda, Calif., was the scene of the second Annual Christmas Party of the Northern California Rubber Group, which was held on December 18, with 120 members and guests attending. During the course of the evening the retiring officers were presented with gifts and the incoming officers for 1945 announced. The new officers include: Russell Kettering (Oliver Tire), president; Lyn Shafer (American Rubber Mfg.), vice-president; Winston Winterbourne (Oliver Tire), secretary-treasurer; and Fred Swain (Pioneer Rubber Mills), Don Good (American Rubber), and Griff Oliver (Oliver Tire), members of the board of directors.

The success of the party was largely due to the hard work of a special committee, the members of which were assisted by their wives. In addition to professional entertainment, those in attendance were treated to some special entertainment furnished by a barber shop "quartet," attired in typical costumes, the "quartet" consisting of Fred Swain, Don Good, Walt Boswell, Russ Kettering and Griff Oliver. Dancing continued until a late hour and Herman Jordan (DuPont) showed motion pictures of the two summer outings held to date by the group.

Christmas corsages and table favors for the ladies were at each place, and a drawing was held for prizes for the ladies, made possible through the generous contributions of the following concerns:

American Rubber Mfg. Co., California Cotton Mills, E. I. du Pont de Nemours & Co., Farrel-Birmingham Co., Goodyear Tire & Rubber Co., C. P. Hall Co., Hycar Chemical Co., Imperial Color & Paper Corp., L. H. Butcher Co., Marine Magnesium Products Corp., Martin, Hoyt & Milne, Naugatuck Chemical, New Jersey Zinc Sales Co., Oliver Tire & Rubber Co., Oronite Chemical Co., Pacific Rubber & Tire Mfg. Co., Pioneer Rubber Mills, Plant Rubber & Asbestos Works, Reliance Rubber Co., H. M. Royal, Inc., R. T. Vanderbilt Co., Shell Chemical Co., Shell Development Co., Shell Oil Co., Stanco Distributors, Inc., Standard Oil Co., Thiokol Corp., Universal Rubber Co.

Named American Anode Official

Dr. Robert V. Yohe, who has been manager of the synthetic rubber plant operated at Louisville, Kentucky, by the B. F. Goodrich Co. for the government, has been elected a vice-president of American Anode, Inc., Akron, a Goodrich affiliate. Dr. Yohe joined Goodrich in 1931 as a research chemist and became manager of the company's general chemical laboratories in 1936, and technical superintendent of the sundries, sponge rubber and latex products division in 1939. In 1942 he became assistant director of synthetic rubber research and was technical superintendent of the chemical division before being transferred to Louisville.

GENERAL ELECTRIC REVIEWS ELECTRICAL DEVELOPMENTS

The General Electric Co., Schenectady, N. Y., has issued its annual review of electrical developments. The latest review, covering developments in the year of 1944, included sections on rubber and wire and cable, abstracts of which follow:

Rubber: Off-gage scrap will be reduced and operation will be speeded up by a new type of calender drive for rubber mills in which eight amplidyne equipments will be used to regulate the calender speed, maintain tension on all the pre-calender sections, and regulate the speed on the post-calender sections. The four-roll calender, operating over a speed range of 6 to 60 yards per minute, will be driven by a 350-hp. motor. The pre-calender auxiliaries, consisting of four drying-drum sections, and the post-calender auxiliaries, including a cooling-drum section and a double windup, will be motored with units ranging from 3 to 7½ hp. The electrical system is notable in that each section is motorized, with only an electrical tie between them.

In the manufacture of tires, accurate control of the weight of stock at various points throughout the process is extremely important from the standpoint of the conservation of completely processed raw materials and also for product quality control. The tire will be unbalanced if the weights of component parts are not uniform. One of the most important points in the process is where the tuber extrudes the sidewall and tread stock onto a conveyor. By regulating the speed of the conveyor with respect to the tuber, the weight of rubber per unit of length can be regulated.

A system applying controls already developed was evolved whereby a small adjustable reactor control unit is mechanically coupled to scales which weigh the extruded stock. Reactance of the unit, changing with any change in weight of the rubber, controls the grid-control circuit of a pair of thyratron tubes which in turn control the speed of a d-c motor driving the conveyor. Speed of the take-away conveyor is thus regulated automatically to maintain uniform weight of the extruded stock.

Wire and Cable: Flamenol, the thermoplastic synthetic insulating material, played a leading role in the year's developments in insulated wire and cable. Railway signal cable employing such insulation was produced without fibrous protective coverings, for both aerial and direct-burial applications. It was because of notable improvements in the moisture resistance and the electrical properties of the dielectric that the new design proved acceptable for such specialized and important service. Over-all dimensions and weights of the signal cable were reduced by elimination of several conventional parts in the simplified design.

Flamenol insulation was also applied most successfully to small-diameter wire for use in wet locations. Without fibrous or lead external coverings, the new wire features small over-all diameter, reduced weight, and greater ease of installation. It is the first of its type to be recognized by the Underwriters' Laboratories for wet-location, 600-volt service.

A variety of permanent colors, not previously available in rubber compounds, added style and appeal to cord types for table appliances when Flamenol insulation was applied to a new line of all-synthetic flexible cords for light-, medium-, and heavy-duty use on appliances, tools, and portable equipment. In the heavy-duty types, long life and satisfactory service were assured by the exceptional impact, abrasion, and oil resistance, and the high flexibility over a wide temperature range afforded by the Flamenol insulation.

Gillette in New Post

Senator Guy M. Gillette, of Iowa, who has headed a special Senate committee investigating the synthetic rubber program for the past two years, has been nominated as a member of the newly-created Surplus Property Board. Senator Gillette, a middle-of-the-road Democrat, was defeated for re-election in the last election. Firmly opposed to the scrapping of any of the synthetic rubber plants in the post-war industry, the senator is planning a speech before he retires from Congress stressing the vital part synthetics have played in keeping both the battle and home fronts moving.

Terson Brand Rayon Voile

Some information on the Terson Brand rayon voile, one of the vinyl resin-coated fabrics developed by the Athol Manufacturing Co., Athol, Mass., for the war effort, small quantities of which are now being made available for non-military use, was recently released. Developed as a result of laboratory studies of vinyl resin coatings, the Terson Brand coated cloth is said to have two major advantages: (1) It has a total weight of only 2 ounces per square yard, and (2) it will stand 10 pounds hydrostatic pressure. At present, the material is available for development purposes only in one color—transparent.

Seeks Import Connections

The National Chemical Corporation, 22 Strand Road, Calcutta, India, is interested in contacting manufacturers and exporters of rubber products in the United States and Canada who are seeking outlets to market such products in India. The company has been engaged in the wholesaling of rubber products of all kinds for many years and is reported to have an efficient sales organization.

NEW TYPE RUBBER RESIN DEVELOPED BY GOODYEAR

Goodyear Tire & Rubber Co., Akron, has announced the development of a new compounding ingredient which is expected to expand synthetic rubber's range of usefulness to a host of products formerly confined to natural rubber. The new ingredient—a resin obtained from a special type of synthetic rubber—has no bearing on the tire situation, since it is generally unsuited for the compounding of rubber for tires.

The new synthetic rubber resin, as Goodyear terms it, is reported to impart rigidity to synthetic rubber itself in direct proportion to the amounts used in compounding, an important factor in wire and cable insulation, safety helmets, golf ball covers, and similar products where an extremely rigid, lightweight, impact-resistant product is desired. Replacing carbon black, it permits production of synthetic rubber products where colors are desired, as in household and decorative items, toys and kitchen equipment, and where high resistance to electrical current is required.

Produced in three grades, designated as Pliolite S-1, S-2 and S-3, the new resin is said to eliminate the use of carbon black entirely as a reinforcing agent in certain compounds. Its use is claimed to mean high dielectric strength, improved processability of synthetic rubber, reduced curing time, and high tensile strength with excellent elongation.

All three grades of synthetic rubber resin are being produced as powders or as masterbatches, the latter consisting of 50% resin and 50% synthetic rubber of the Buna S type. Types and grades of synthetic rubber in the masterbatches can be tailored to fit individual needs. The resins are being produced with methods and in equipment intended originally to produce them with natural rubber.

In compounding synthetic rubber with the new resins, according to Goodyear, both are mixed on mill rolls in varying quantities to produce the desired rigidity, hardness, elongation and tensile, with the hardness increasing in direct proportion to the amounts of resin. The resins, aside from the already-compounded masterbatches, also can be compounded with the Buna N type of synthetic rubber.

In announcing the new materials, Goodyear also claimed that their use will reduce the time needed for tubing and extruding synthetic rubber and for calendering fabrics.

New Channel Black Plant

The Defense Plant Corporation revealed on January 9 that a contract was recently awarded to the Continental Carbon Co. for the construction of a channel black plant at Sunray, Texas. The plant, which will cost approximately $1,200,000, is expected to be in operation within the next two or three months, and will have a capacity of 15,000,000 pounds a year.

NEW POST-WAR APPLICATIONS ARE PREDICTED FOR NEOPRENE

Release of neoprene from war's demands will bring greater durability and practicality to many household products, according to a forecast made by E. I. du Pont de Nemours & Co., Inc. Sponge cushions and mattresses, tile-like flooring material, carpet backing and numerous structural parts are named as possible applications, in addition to such pre-war items as household gloves, sink strainers, mats and crib sheets.

Neoprene, it was reported, will have an important influence on the kind of cushioning that will be used in the post-war home. For example, neoprene latex used in the manufacture of foam sponge makes products that will extend the usefulness of cushioning, since neoprene foam sponge, unlike that of natural rubber, can be made flame resisting. While it will burn in contact with flame, it ceases to burn when the flame is withdrawn. Cushions and mattresses made of neoprene can be safely exposed to sunlight and home, hospital or crib mattresses can be safely sterilized in steam.

New Type Mattress Material

Sponge mattresses will not, however, be without worthy competition. Another type of mattress material will appear in tomorrow's home—a light-weight type made of goat's hair and neoprene. In making this mattress, an open mesh is formed by bonding goat's hair with neoprene latex. The mesh is folded to form a spring layer about an inch in thickness. Several layers of this material are built up to the desired thickness. Here again neoprene improves the flame resisting and aging properties of the completed product.

Predicted for carpets and rugs is a durable backing, made by applying neoprene cement to the floor side of the rug, firmly anchoring the nap in place. The coating, which is especially valuable for the commonly used "U"-shaped naps, adds but little to the over-all cost of the rug. The use of neoprene will permit cleaning with solvents that would readily attack rubber backings. An additional, thicker coat may be applied to furnish a non-skid feature.

There is also prospect of a new type of terrazzo flooring made by stirring marble chips into colored neoprene latex, pouring the mixture over the floor foundation, and troweling it down. Satisfactory installations in shipboard shower stalls, staterooms and galleys, indicate that this tile-like flooring may be adaptable to home bathrooms, cellar playrooms, kitchens, swimming pools, and terraces. Combinations of two or more colors can be developed and border treatments may vary the pattern. Such a flooring not only gives a decorative effect but offers a resilient surface, is non-slipping whether wet or dry, and does not crack easily, according to the manufacturer. It is said not to be affected by changes of temperature.

The material can be applied in a single coating as thin as three-eighths of an inch without a special sub-base; whereas ordinary tile normally requires two or three inches of concrete sub-base. This gives the new type the advantage of less weight, and makes it possible, as well, to trowel it down over a sub-floor without raising the grade to an objectionable degree. The coating will adhere to wood, concrete, steel, and almost any other kind of floor surface.

Post-War Products Exhibit Planned

The first National "Products of Tomorrow" Exposition, for manufacturers who can qualify with post-war products that are reasonably new, is planned for the early Spring of 1945 at the Chicago Coliseum, Chicago, Ill. The exposition is expected to open on approximately March 1, and will feature laboratory models and products actually ready for the post-war market. From surveys of American business and from requests for space in the exposition, already applied for, the fields of plastics and synthetics rank high in the industries readying new ideas for civilian trade. Further information concerning the exposition may be secured by writing directly to Marcus W. Hinson, General Manager, "Products of Tomorrow Exposition," Chicago Coliseum, Chicago, Ill.

Firestone Plastic Film

Raincoats so light and thin that they can be slipped into a woman's hand-bag and inexpensive awnings that neither fade nor wear out are two of hundreds of post-war products visualized from a new plastic film developed by the Firestone Tire & Rubber Co., Akron. The newest member of Firestone's Velon plastic family, the new film can be made as thin as a hair and as soft and flexible as fine cloths, yet comparable in strength to metals. It can be stitched with an electronic sewing machine or stitched in conventional fashion. It can also be sprayed or brushed on textiles and paper to waterproof and strengthen them. The new film was actually developed to protect aircraft engines from moisture during shipment to the battlefronts.

Johnson Building New Plant

Johnson Rubber Co., Middlefield, Ohio, is rapidly completing a branch plant at Burton, Ohio, which will give employment to many women in that area. The new plant will help fill several of the company's large war contracts for rubber parts, but eventually will shift to civilian work. Prior to the war, Johnson manufactured mechanical rubber goods for automobiles, refrigerators, vacuum cleaners, washing machines, etc. The company now employs approximately 500.

SPECIAL RUBBERIZED FABRIC TENTS PART OF ARMY FIELD HOSPITALS

The tent shown in the above illustration has a novel construction which prevents even the tiniest flicker of light from penetrating its interior. In it, X-ray pictures of injuries suffered by United States military forces in action are made, it being particularly valuable in this field when the surgeons must know where a piece of steel is imbedded in the wounded man. Made of rubber and fabric, the tent was developed by the Army Medical Corps, and is being built by the B. F. Goodrich Company, Akron. They are now being used on many battlefields where they are erected as part of field hospitals.

THREE YEARS OF SCARCITY FORECAST BY R. P. DINSMORE

A tight rubber situation faces the world for the next three years, and, depending on the progress of the war, a surplus will become apparent no earlier than 1948, R. P. Dinsmore, vice-president of the Goodyear Tire & Rubber Co., Akron, told members of the New York Society of Security Analysts at a luncheon meeting held on December 20 in New York City.

Speaking on "Future Prospects in Rubber," Dr. Dinsmore stated that figures presented last May in respect to the potential post-war demand for rubber were based on the assumption that the war would be completely over by the end of 1946 and the European conflict ended by the middle of 1945. The demand of the military services for large truck tires has been increased by the developments of the European war, he said, citing the fact that 5,000 heavy truck tires are "chewed up" every day by our trucks bringing supplies from the ports to the battle lines.

Estimating potential American requirements for various types of rubber goods in the next four years, Dr. Dinsmore set 1947 as the peak of passenger tire production for that period with a total of 70,000,000 such tires being needed then for both original equipment and renewals. His previous estimate had been 80,000,000. Considerable increases also were forecast for consumption of rubber in mechanical goods and footwear production, as well as for other civilian uses, some of which will be new while others will continue pre-war developments.

1948 Will Be Turning Point

By 1948, the speaker stated, world demand for rubber would reach 1,559,000 long tons, with a total supply of 1,591,000 long tons available to meet it, comprised of crude rubber receipts, foreign synthetic production and United States synthetic production. Thus, 1948 will mark the first year in which the world supply will exceed the demand.

"Synthetic rubber must not only meet our war needs, but must be able to cope with a considerable portion of our post-war requirements, for two or three years, with all the changed conditions under which rubber products will be produced," said Dr. Dinsmore. "It is likewise evident that synthetic has four or five years in which to become competitive, in cost and quality, with the natural product.

"It is evident that the maximum requirement for United States synthetic would never demand full capacity production, and, after 1947, never exceed the capacity of the economical units, dwindling to one-third total capacity in 1950."

Concluding his address, Dr. Dinsmore declared that the future of the rubber industry appears as bright as any that can be mentioned and far above the average. "It is quite probable that the new synthetic industry, which has matured so rapidly under the stress of war, will prove almost as great a stimulus to the rubber industry's future progress as did the advent of the popular priced automobile," he added.

New "Secret" Weapons

The morale of Japanese troops in the Philippines was badly shaken when they saw rubber heels and tin cans in the Red Cross packets delivered to American prisoners in Japanese prison camps, according to Capt. Felix G. Sharp, Jr., who was recently repatriated and who has returned to the United States. According to Capt. Sharp, who survived the sinking of a Japanese transport, the Japs believed the United States to be "out of these things."

Neutroids—New Latex Stabilizers

A series of latex and emulsion stabilizers for synthetic rubber latices, including GR-S, Hycar and neoprene, as well as for natural latex and reclaimed dispersions of rubber, have been developed and introduced by the Organic Chemical Division of Premoid Products, Inc., West Springfield, Mass. Commercially known as Neutroids, the new interface active agents are made by the condensation of fatty acids and amines, and are available in quantity in several different modified condensates. Neutroids are reported to be exceptionally effective in the stabilization of GR-S latex against the coagulating influence of compounding ingredients such as zinc oxide, accelerators, activators, and inert fillers containing ionizable matter. They are used from 1 to 2%, based on the dry rubber solids.

U. S. Rubber Refinances

U. S. Rubber Co. has made arrangements for the private sale of $30,000,000 ten-year serial notes bearing 2 per cent interest. Proceeds of the sale will be used to retire the company's $29,308,000 first mortgage and collateral trust 3½ per cent bonds, due July 1, 1958. More than a score of banks participated in the refinancing. The original issue of the first mortgage and collateral trust bonds, brought out on July 1, 1938, was for $45,000,000.

Montreal to Hear Woodcock

The next meeting of the Rubber & Plastics Division of the Chemical Institute of Canada (the Montreal Rubber Group) will be held on February 9 at the Ritz-Carlton Hotel in Montreal, Canada. William Woodcock, Fine Chemicals Division, Carbide & Carbon Chemicals Corp., will address the group on "Plasticizers."

FINAL REPORT IS ISSUED ON RUBBER SAFETY CONTEST

The final report of the 1943-44 Safety Contest conducted by the Rubber Section of the National Safety Council, Inc., shows that 34 plants participated, 19 in the group of larger plants and 15 in the smaller plants group. The average frequency rate for the 12-month period for all 34 contestants was 9.61. The group of smaller plants experienced an average frequency rate of 23.44 as compared to 9.06 for the larger plants. Three of the contestants completed the contest period without a reportable injury, as compared to four for the 1942-43 contest.

The combined experience of both groups of plants shows a 14% increase in frequency as compared to the experience of both groups for the previous contest period. The large plants group showed a 20% increase and the smaller plants group a 20% decrease. The accident frequency rate shown by the results of these contests closely follows that of the entire rubber industry and the experience of the contestants is representative of that for the industry.

A comparison of the frequency rate of the rubber industry with all industries for the past five years indicates that both show an upward trend, whereas prior to 1939 the trend was downward. In 1941 all industry reached a frequency of 15.39, which was the highest for all industry since 1931. This rate decreased to 14.52 for 1943. The rubber industry, on the other hand, showed a frequency rate of 11.14 for 1943, which was the highest for this industry since 1933. In other words, all industry reached a nine-year peak in 1941 and then showed a small decrease for 1942 and 1943, whereas the rubber industry showed the nine-year peak in 1943.

Dewey Heads A.C.S.

Col. Bradley Dewey, president of the Dewey & Almy Chemical Corp., Cambridge, Mass., and former rubber director, has been elected president of the American Chemical Society for 1946. Colonel Dewey, who resigned as rubber director on September 1, declaring that supervision of the synthetic rubber program no longer was necessary, took office as president-elect on January 1, 1945. Col. Dewey holds the 1944 Chemical Industry Medal for application of chemical research to industry.

Dayton Acquires Jem Rubber

The acquisition of the Jem Rubber Co., Ltd., of Toronto, Ontario, has been announced by the Dayton Rubber Manufacturing Co., of Dayton, Ohio. The Canadian plant will henceforth be operated under the name of the Dayton Rubber Co. of Canada, Ltd. A completely-equipped laboratory is being installed to design and improve products for the post-war period.

ARMY INAUGURATES PLAN TO EASE OVERSEAS TIRE SITUATION

Due to the urgent military need for tires overseas, a plan has been inaugurated by the Army whereby certain type tires on vehicles are removed and replaced by reconditioned tires. Trainees in the tire section of the Army Service Forces Training Center at Camp Lee, Virginia, are cooperating in the program, with approximately 100 tires being changed at that center daily. All tires on Army vehicles at the center having 50% or more of mud and snow type tread remaining are removed for overseas use.

All Quartermaster truck drivers and mechanics trained at the center receive practical instruction in first and second echelon preventive maintenance services. When the training center was started in 1941, Army tires at Camp Lee were averaging 10,000 miles of service. Now they get close to 30,000 miles per tire—largely due to stressing of preventive maintenance precautions and training in the proper care and use of tires.

At the tire section of the training center, German and Jap tires are hung on the walls. They were picked up by a Quartermaster salvage outfit in North Africa—and it was rather unusual to find a Jap tire with trade inscriptions in English on a German vehicle in North Africa. The enemy tires are used as training aids, demonstrating the quality of Axis rubber. Other enemy tires have been put on Army vehicles here, and Captain Charles Schaevitz, head of the tire section of the training center, says he has found they stand up as well as our own. The instructors at the tire section are all former tire men in civilian life.

Ontario to See Films

Three outstanding sound films will feature the next meeting of the Ontario Rubber Section of the Chemical Institute of Canada, to be held at the University of Toronto, Ontario, on Tuesday, January 23. The films are: "The Battle of Britain," which deals with the story of the Luftwaffe vs. the R.A.F.; "Highballing to Victory," which depicts the part heavy duty tires play on the battle fronts; and "Freedom Rides on Rubber," which treats with the history and development of rubber and synthetic rubber. The first two films are those of the U. S. War Department, while the other is being shown through the courtesy of the Firestone Tire & Rubber Co. Dinner at the University will precede the meeting.

Increase Funds for Plant

The Defense Plant Corp. has authorized an additional allocation of $1,000,000 of federal funds to the Firestone Tire & Rubber Co. for its new tire plant to be operated by that company at Des Moines, Iowa. This recent allocation brings the total allotment for tire production expansion at Des Moines to $6,100,000.

Kratz Back with Norwalk

George C. Kratz

George C. Kratz, who was associated with the Norwalk Tire & Rubber Co., Norwalk, Conn., from 1914 to 1917, has returned to that company in the capacity of vice-president in charge of rubber development. Mr. Kratz left Norwalk in 1917 to become chief chemist and superintendent for the former Falls Rubber Co. in Akron, and later was made president of that company. From 1929 to 1934, he acted as a general consultant on latex and rubber, and in the latter year joined the Vultex Chemical Co., now known as the General Latex & Chemical Corp. In 1942 Mr. Kratz joined the U. S. Department of Agriculture at the Eastern Regional Research Laboratory and later was called to Washington where he served the Rubber Reserve Co.

Chlorinated Synthetic Rubber

Development of a chlorinated synthetic rubber has been announced by the Goodyear Tire & Rubber Co., Akron. The new product, which is based on a new type of synthetic rubber especially developed for the purpose because standard GR-S is difficult to chlorinate and the process is not yet commercially feasible, is supplied in the form of a powder and is creamy white in color. The chlorine content ranges between 60 and 70%. The sunlight resistance of the new material is said to be equal to that of the natural product and to show the same compatability when mixed with modifiers, plasticizers, etc. It is soluble in all aromatic hydrocarbons, including benzene and toluene, and is also soluble in methyl ethyl ketones and in esters like ethyl acetate and in chlorinated hydrocarbons. In connection with its announcement of the new chlorinated synthetic rubber, Goodyear revealed that Russia has been carrying on extensive experiments in the chlorination of the shrub rubbers, such as that made from koksaghyz.

CORRECT WHEEL ALIGNMENT APPLIED TO AIRPLANE DESIGN

Saving tires through correct wheel alignment, long an important consideration in the design and operation of automobiles and trucks, is now being applied to airplanes. The B. F. Goodrich Co., Akron, has issued a special bulletin for airplane design engineers in conjunction with this new trend.

Noting that for the most part airplane landing-gear designs provide satisfactory alignment, the tire company stated that investigations of certain instances of rapid tread wear have shown the main tire to be out of alignment as much as an inch and three-quarters. Four conditions are cited by which abnormal tread wear due to misalignment may be recognized. They are: (1) Tread worn out in abnormally low service life; (2) Saw-tooth wear of buttons of the tread design; (3) Feather edges on ribs or buttons; and (4) Tread worn out at shoulder at edge of ground contact area.

Pointing out that there have been cases where "the peculiarities of the landing-gear geometry" have caused abnormal and excessive tread wear, the bulletin appeals to airplane designers to avoid wheel camber (convexity) in landing-gear designs, and to designers to avoid toe-in or toe-out.

Optimum conditions can most likely be obtained by adjusting wheels to zero toe-in for the three-point airplane position, because this will take care of all the excessive wear occurring when the tires are carrying heaviest static loads, according to the bulletin.

Establish Chemical Department

A new chemical department has been established by the General Electric Co., in accordance with the company's policy of modifying its organization structure to take full advantage of opportunities for future growth. The department, established as of January 1, will be a regular operating unit of the company, and it will assume the responsibility for all operations pertaining to the plastics division and the resin and insulation materials division of the company. The latter two divisions previously have been part of the company's Appliance and Merchandise Department. Dr. Zay Jeffries, technical director of the company's lamp department, has been elected a vice-president, and will act as general manager of the new chemical department.

Norflex Polishing Wheels

Norton Co., Worcester 6, Mass., has announced the introduction of a line of Norflex polishing wheels. The new wheels come in three types—cork resinoid, resilient rubber, and fiber resinoid, the latter one of the company's latest developments. The Type R (resilient rubber) wheels are recommended for operations at 3300 to 6000 s.f.m.p.

NAMES IN THE NEWS

EDWARD E. DIEDRICHS, sales manager of the Arabol Manufacturing Co., New York City, has been appointed director of sales of that company. WILLIAM G. MOLLENBERG has been named general manager of the company's midwestern division, and CHARLES J. KASPER as assistant to MR. MOLLENBERG and superintendent of the company's plant at Cicero, Ill.

J. E. THOMAS, who has been engaged in work on war contracts for the past three years for the B. F. Goodrich Co., Akron, has been named manager of cement sales in the Industrial Products Sales Division of that company. He has been with Goodrich since 1930.

JOHN L. COLLYER, president of the B. F. Goodrich Co., Akron, has been elected a vice-president of the National Association of Manufacturers.

HOWARD C. STEINER, who has been acting as managing director of the Goodyear Tire & Rubber Co. of Australia, Ltd., since the retirement of the late WILLIAM G. KITHER in May, 1944, has been appointed vice-chairman of the board of directors of that company. He has been with the Australian company since 1930.

ANTHONY SKETT, recently director of research development and sales promotion of American Gum Importers Laboratories, is now associated with R-B-H Dispersions, Inc., Bound Brook, N. J.

CHARLES W. MCKAY, production manager of Dunlop Rubber Australia, Ltd., and R. SIMPKIN, sales manager of that company, are in the United States on a visit for a few weeks and will visit suppliers and rubber factories here and in Canada.

J. W. BRITTON, of the Dow Chemical Co., Midland, Mich., has been elected to the board of directors of the Thiokol Corp., Trenton, N. J. He succeeds DR. E. EMMETT REID, who resigned his position on the board.

DAVID L. EYNON, JR., plant manager of the Longhorn Ordnance Works, which the Monsanto Chemical Co. operates for the government at Karnack, Texas, has been promoted to the position of assistant to the general manager of the company's Organic Chemicals Division.

SEYMOUR T. HULL, former manager of the purchases and materials division of the Los Angeles plant of the U.S. Rubber Co., has joined the Manhattan Soap Co. in New York City as purchasing agent.

J. E. TROYAN, formerly assistant chief of the copolymer development branch of the Office of the Rubber Director, is now supervisor of the polymerization pilot plant maintained at Phillips, Texas, by the Phillips Petroleum Co.

OLIN C. WORK, who recently resigned as works manager of the Vulcanized Rubber Co., Morrisville, Penna., is now associated with the Ideal Rubber Co., Brooklyn, N. Y., as plant manager.

CHARLES FETZNER, branch manager of the Monsanto Chemical Co. at Los Angeles, Calif., recently marked his twenty-fifth year of service with that company. He was honored at a dinner held at the Jonathan Club in Los Angeles.

NEHEMIAH BOYNTON, JR., formerly manager of the light mechanical goods division of the Boston Woven Hose & Rubber Co., has joined the Haartz-Mason-Grower Co., Watertown, Mass., as vice-president and sales manager.

CHARLES JANSEN, of the Wilmington Chemical Corp., New York City, became a father for the third time earlier this month. The new arrival has been christened Mary Ann.

NORMAN BEKKEDAHL, of the Rubber Section of the National Bureau of Standards, has returned to Washington after spending two years in Brazil where he directed the establishment of a modern rubber laboratory in Belem for the Instituto Agronomico do Norte.

NORMAN S. GRACE, chief chemist of the Dunlop Tire & Rubber Goods Co., Toronto, Ontario, for the past several years, has been named technical superintendent of that company. R. C. HUGHES has been named production superintendent and S. PARKES has been placed in charge of product design and process control of the company's mechanical goods department.

C. H. SOMMER, JR., associated with the Organic Chemicals Division of the Monsanto Chemical Co., at St. Louis, Mo., for several years, has been promoted to manager of plasticizers and resins sales of that division.

DR. FRANKLIN D. SMITH, who has been a member of the development department of the Organic Chemicals Division of the Monsanto Chemical Co., St. Louis, Mo., specializing in organic chemical problems, since September 1943, has been appointed assistant director of development for that division of the company. He has been with Monsanto since 1930.

Fenlason Named Vice-President

Charles Fenlason, who has been factory superintendent of the Martin Rubber Co., Inc., Long Branch, N. J., has been named vice-president in charge of production of that company. Anthony Appella and Heinz Goldstein were named as assistant superintendents of the plant. At the same time it was revealed that plans are being formulated for an additional building to be erected in the near future.

P. H. OBER, vice-president of the Mansfield Tire & Rubber Co., Mansfield, Ohio, was seriously injured in a fall suffered on December 15, both hip and shoulder being broken. He is 78 years of age.

HAROLD W. REHFELD, tire technician of the B. F. Goodrich Co., Akron, has been named expert consultant to the Commanding General of the Army Service Forces in Europe with headquarters in France. He will advise the ASF on tire service and maintenance as well as the rubber manufacturers of Belgium and France on the use of synthetic rubbers and other raw materials.

J. M. CRAWFORD, chief engineer, Chevrolet Division, General Motors Corp., has been elected president of the Society of Automotive Engineers for 1945.

SELDEN T. WILLIAMS, superintendent of the Brooklyn, N. Y., factory of A. Schrader's Son, has been elected vice-president in charge of manufacturing operations in all plants of the company. He has been with Schrader since 1929.

J. E. MAYL, vice-president and sales manager of the tire division of the Goodyear Tire & Rubber Co., Akron, has completed 20 years of service with the company and has received his 20-year pin. He joined the company in December, 1925, as a member of the truck tire sales department.

CHARLES BURKE, assistant to the president of the General Tire & Rubber Co., Akron, has been named to a five-year term as a member of the Akron Recreation Commission.

CHARLES W. PERRY, former chief of the Polymer Development Branch of the Office of the Rubber Director, is now associated with the Phillips Petroleum Co., Bartlesville, Oklahoma, as an analyst for new processes.

GEORGE L. PETERS, JR., who was formerly in the laboratory of the Peters Bros. Rubber Co., Inc., Brooklyn, N. Y., and enlisted in the armed forces in August, 1942, was recently injured in the Allied invasion of Leyte in the Philippines. He suffered a bomb injury in his leg and minor head injuries.

DINNER-DANCE FEATURES CHICAGO GROUP XMAS PARTY

The Chicago Rubber Group held its annual Christmas Party on Friday, December 15, at the Morrison Hotel, in Chicago, Ill. Approximately 475 members, guests, and their wives attended. The committee which did so much to make the affair the success it was consisted of W. J. Reidy (American Zinc Sales), chairman, E. J. Horan (Inland Rubber), co-chairman, J. T. Adams (Sears-Roebuck), S. M. Davis (C. P. Hall), D. M. Pratt (Marbon), and J. P. Sheridan (N. J. Zinc).

A two-hour floor show including acrobats, comedians, musicians, and dancers was presented, and music for dancing was provided by Herbie Mintz and his Orchestra. The dancing continued until a late hour. Prizes were distributed through the generosity of the following companies:

Advance Solvents & Chemical Corp., Airlastic Rubber Co., Akron Standard Mold Co., L. Albert & Son, American Can Co., American Industrial Rubber Co., American Mineral Spirits Co., American Zinc Sales Co., Anchor Rubber Mfg. Co., Auburn Rubber Corp., B & B Enterprises, Barrett Division, Bibb Mfg. Co., Binney & Smith Co., Brown Rubber Co., Godfrey L. Cabot, Inc., Callaway Mills, Carter Bell Mfg. Co., Chicago Belting Co., Chicago Cutting Die Co., Cleveland Liner & Mfg. Co., E. W. Colledge General Sales Agent, Inc., Commerce Petroleum Co., Commercial Solvents Corp., Continental Carbon Co., Cupples Co., Darling & Co., T. A. Desmond & Co., Inc., Diamond Wire & Cable Co., Dryden Rubber Co., E. I. du Pont de Nemours & Co., Eagle-Picher Sales Co.

Also Farrel-Birmingham Co., Felt Products Mfg. Co., Frost Rubber Works, General Atlas Carbon, General Latex and Chemical Corp., General Magnesite & Magnesium Co., Genseke Bros., C. P. Hall Co., Herron & Meyer, J. M. Huber, Inc., Hycar Chemical Co., Ideal Roller & Mfg. Co., Inc., *India Rubber World*, Industrial Rubber Goods Co., Inland Rubber Corp., International Smelting and Refining Co., Douglas P. Johnstone, Judsen Rubber Works, Kraft Chemical Co., La Jone Rubber & Mfg. Co., Loewenthal Co., McNeil Machine & Engineering Co., Marbon Corp., Midwest Rubber Reclaiming Co., Monsanto Chemical Co., H. Muehlstein & Co., National Rubber Machinery Co., National-Standard Co., Naugatuck Chemical, N. J. Zinc Sales Co., Palmer Asbestos & Rubber Corp., Pequanoc Rubber Co., Philadelphia Rubber Works Co., Phillips Petroleum Co., Pittsburgh Plate Glass Co.

Also Rainfair, Inc., Resinous Products & Chemical Co., Hex-Hide, Inc., Roth Rubber Co., RUBBER AGE, W. H. Salisbury & Co., A. Schulman, Inc., Henry L. Scott Co., Sears, Roebuck & Co., Sherwin-Williams Co., Stamford Rubber Supply Co., Stanco Distributors, Inc., Standard Chemical Co., Stauffer Chemical Co., Thiokol Corp., Titanium Pigment Corp., Union Asbestos & Rubber Co., United Carbon Co., U. S. Rubber Reclaiming Co., Van Cleef Bros., R. T. Vanderbilt Co., Wear Proof Mat Co., Western Felt Co., Western Shade Cloth Co., Williams-Bowman Rubber Co., Wilmington Chemical Corp., Witco Chemical Co., and Xylos Rubber Co.

Consumption of Soap

The new synthetic rubber plants, now running at top speed, are consuming soap at the rate of 100,000,000 pounds a year, according to a statement from the Procter & Gamble Co., Cincinnati. This is equivalent to the soap needs of the entire population of Chicago for one year. The statement also referred to the fact that a 10-ton pontoon bridge uses 3,200 pounds of synthetic rubber involving 192 pounds of soap, that 31 pounds of soap are required to make a set of synthetic rubber tires for the Army's 2½-ton, eight-wheel truck, and that the Navy uses more soap in the rubber insulation of the intricate wiring systems on its battlewagons than in keeping the crews clean.

Form Jefferson Chemical Co.

The Jefferson Chemical Co., Inc., a new organization for the manufacture and sale of chemicals and chemical by-products from petroleum and petroleum gases, has been organized by the Texas Co. and the American Cyanamid Co. Plants for the new company will be erected adjacent to the various refineries maintained by the Texas concern. The latter company has been eyeing the rubber industry in recent months and recently completed a new rubber laboratory at Beacon, N. Y.

Adopts New Insignia

The Pittsburgh Plate Glass Co., Pittsburgh, Penna., has adopted a new official insignia. As shown in the accompanying illustration, it will consist of the letters PPG, interlocked. The

new insignia was adopted in order to facilitate the ready recognition of the company's varied products. It will appear on all labels or other means of product identification, advertisements, letterheads, packages, signs, or wherever the company signature might be used throughout its entire organization, including its Columbia Chemical Division.

ROLE OF SYNTHETIC RUBBER IMPORTANT TO SOVIET UNION

The relative importance of the role of locally produced synthetic rubber in the Soviet Union has increased during the war, according to the foreign press as reported by the U. S. Bureau of Foreign & Domestic Commerce. Production from Soviet plants accounted for 80 per cent of the country's total rubber consumption in 1940, it is said, and the third Five-Year Plan, which went into operation in 1938, provided for 13 additional plants, many of which probably have gone into operation since the war began.

Growth of the synthetic-rubber industry in the Soviet Union has been rapid. Discussions on the subject in 1926 led to a 5-year period of investigation of methods and experiments. By 1933, three plants were in operation and more than 2,000 tons of synthetic rubber were produced from butadiene. Output totaled 11,000 tons in 1934 and 20,000 tons in 1935. In 1936, the introduction of emulsion polymerization techniques resulted in an accelerated rate of output.

Yield of butadiene from alcohol has increased rapidly also. In experimental operations in 1928, the percentage of butadiene amounted to 20. By the latter part of 1939, this had been increased to 40-41.

In addition to the butadiene rubbers, the Soviet Union also produces Sovprene, a chloroprene rubber. By the end of 1935, four factories were turning out tires from this compound. An isoprene rubber was also in commercial production in 1940.

Course in Rubber Technology

In connection with the government's E.S. & M.W.T. program, Morris Omansky, well-known consulting chemist and rubber technologist of Cambridge, Mass., will give a course on rubber technology under the auspices of Northeastern University. The course will start during the week of January 22, and will consist of fifteen weekly three-hour periods. It is open to people in the rubber industry with a high school education or its equivalent. Application for the course should be made directly to Northeastern University, on whose premises the course will be given.

Romanian Plant to Reopen

The B. F. Goodrich Co., Akron, has announced that the Banloc tire plant, near the Ploesti oil fields in Romania, liberated from German occupancy in August, will shortly resume manufacturing operations. Until the outbreak of the war, Banloc was engineered and operated by Goodrich for Romanian interests sponsored by that government. Since that time, it has been running on a limited basis under German direction. When production is resumed, the output of the plant, which has an annual capacity of 100,000 tires, will go to the Allied armies.

NEWS IN BRIEF

A temporary extension, which will provide approximately 1600 square feet of additional floor space to be used for handling stock, is under construction at the Bucyrus, Ohio, plant of the Swan Rubber Co. This plant also recently installed another lead press to serve as stand-by equipment in the event of a breakdown.

Respro, Inc., Cranston, R. I., has awarded a general contract for a new one-story addition to its plant at a reported cost of approximately $35,000.

Rain-Fashions, Inc., is the name of a new organization set up to specialize in the postwar production of women's and misses' rain-wear to be made of Koroseal. Headquarters for the new firm will be in New York City.

A series of proposed public relations newspaper advertisements, the first of their kind to be made so widely available for use by individual companies, were released throughout the country recently by the Meyer Both Co., 369 Lexington Ave., New York City.

Minnesota Mining and Manufacturing Co. has acquired the Mid-States Gummed Paper Co., of Chicago, Ill. It is understood that the purchase price was approximately $1,000,000.

The Synthetics Department of the Hercules Powder Co., Wilmington, Del., has opened a new sales office in the Union Commerce Building, Cleveland, Ohio, to handle its sales in the Middle West. W. Wallace Trowell, of the Wilmington office, will be manager of the new branch office.

Hydraulic Press Manufacturing Co. has opened a New York office at 500 Fifth Avenue to take care of its customers from New England to the Baltimore region.

Goodyear's Airfoam is now being used for the healing of leg ulcers. When applied against the patient's leg, it is said to stimulate the flow of fresh blood into the areas where the ulcer exists.

The Passaic (N. J.) Plant of the U.S. Rubber Co., was recently awarded the Army Air Forces Quality Control Rating, the highest production award granted by the AAF. Among aircraft products made at the plant are bullet-sealing and flame-retardant fuel hose, radio anti-vibration mountings, flexible air ducts and non-metallic fittings, machine gun chutes, and anti-icers for propellers.

Lubrication engineers representing prominent industrial and transportation companies and educators have organized a non-profit body known as the American Society of Lubrication Engineers. Headquarters are maintained at 135 So. La Salle St., Chicago, Ill.

New prices have been established by Stanco Distributors, Inc., New York, on Reference Fluids SR-6 and SR-10. In 50-gallon, non-returnable drums the price of SR-6 is now 85c per gallon and SR-10 is 60c per gallon, f.o.b. Bayway, N. J.

Government agencies handling surplus supplies of petroleum base fluid for hydraulic brakes have agreed to take special precaution so these fluids will not be sold for automotive use, according to the Automobile Manufacturers Association, which pointed out that such fluids designed only for use in military aircraft would cause deterioration of natural rubber parts, such as hydraulic brake cups and flexible hose lines.

A new catalog of its latest technical books, including those on chemistry, physics, general science, metals, etc., has been issued by the Chemical Publishing Co., Inc., 26 Court St., Brooklyn 2, N. Y. Copies can be secured on request.

Ordinary water can now be transformed into the chemical equivalent of distilled water by a simple filtration process developed by the American Cyanamid & Chemical Corp., New York. The process has been made available in portable and stationary equipment designed for all types of users. The units are known as Filt-R-Stil.

Monsanto Chemical Co., St. Louis, Mo., has announced plans to construct a new sulfuric acid plant, with an annual capacity of 72,000 tons, in the plant area of its Monsanto, Ill., properties.

Electro-Technical Products, Inc., Nutley, N. J., has announced plans for the early erection of a 70 x 400 feet, one-story addition to its processing plant, at an estimated cost of $75,000.

Goodyear has revealed that its Pliofilm is speeding the replacement of warplane "run-in" engine cylinders and piston assemblies. The Pliofilm packaging gives assurance that the same tolerance and adjustments still exist as when the parts left their assembly lines and test blocks. Each part is wrapped with a visible indicator card that shows at a glance when the moisture within the package has risen beyond the danger point.

Chicago Plans Reclaim Symposium

The next meeting of the Chicago Rubber Group (scheduled to be held on Friday, February 2, at the Morrison Hotel, in Chicago, will feature a Symposium on Reclaimed Rubber, consisting of three papers. Fred S. Conover (Naugatuck Chemical) will speak on "Technical Problems in Connection with Reclaiming Synthetic Rubber"; Earl S. Busenburg (Philadelphia Rubber Works) on "Compounding Problems with Synthetic Reclaims"; and John S. Plumb (U. S. Rubber Reclaiming) on "Economic Factors Involved in the Transition from Natural Rubber to Synthetic Rubber from the Reclaimers' Standpoint." An Army sound film—Highballing to Victory—will also be shown.

Akron Meets February 16

The regular winter meeting of the Akron Rubber Group will be held on Friday, February 16, in the ballroom of the Mayflower Hotel, Akron. Dinner will be served at 7:00 P.M. Speaker of the evening will be Luke Sewell, manager of the St. Louis Browns, who has recently returned from a 35,000 mile U.S.O. tour in the China-Burma area and will discuss some of his experiences. Some war films will also be shown at the meeting.

The first tank car of allyl alcohol ever shipped left the South Charleston, W. Va., plant of Carbide and Carbon Chemicals Corp. on November 1. Utilizing a new method of synthesis, the company accomplished the production from "test tube to tank car" in six months.

Farrel-Birmingham Co., Inc., has announced the adoption of a retirement pension plan for the employees of its three plants. The plan is designed to provide retirement income to supplement the old age benefits of the Federal Social Security Act.

The tool engineering department of the Glenn L. Martin Co. has developed a new streamlined technique that has reduced PBM Mariner de-icer boot installation time from 8 or 9 to less than 2 hours. The new method makes use of two convenient tables, a set of permanent templates, a pneumatic perforator and mechanical stretching devices that replace previous laborious hand punching and stretching methods.

Organization of war veterans' employment divisions, in both its tire and aircraft plants, has been announced by Goodyear. The company's announced policy relative to rehiring veterans is that they are to be returned to their former positions or to comparable posts upon their return.

Synpep-N—A "Normalizer"

Synpep-N, a new compounding ingredient, the use of which is reported to substantially reduce the adverse effects believed to be due to the random structure of the various synthetic rubber polymers, and which finds application as a "normalizer" for such polymers, was recently developed and introduced by Harsyd Chemicals, Inc., Holland, Michigan. It is described as a clear liquid, brown-red in color, with a specific gravity of 1.1, an aromatic odor, not unpleasant, with a viscosity of approximately 25 poises.

According to the manufacturer, small percentages of Synpep-N, on the order of from 2 to 3%, added directly to the rubber before mixing, gives vulcanizates with improved stress-strain properties, better aging, and improved processing. True sulfur linkage is said to be facilitated with the use of the new material, and reductions up to 40% in curing time have been achieved. Stocks containing the "normalizer" are claimed to have a low shrinkage, resulting in good tubing stocks and better calendering operations. The stock need not be loaded up with softeners and hardness can be held constant with substantial reductions in the amounts of softener used.

The use of the term "normalizer" is explained in this manner: A normal structure for an elastomer should be one as nearly free as possible from branch linkages and one capable of true sulfur cross-linkage to the highest possible degree. Arriving at a condition approaching such a state is defined as "normalization."

Synpep-N is distributed east of the Rockies by A. M. Meincke & Sons, Inc., of Chicago, and on the West Coast by W. C. O'Brien, of Los Angeles.

Cancel A.C.S. Spring Meeting

The board of directors of the American Chemical Society has voted unanimously to omit the general meeting of the Society which was scheduled to be held in the Spring of 1945. Lack of adequate transportation and facilities and the concentration of members in war work were given as the reasons for the action. In lieu of the national meeting, however, separate divisional meetings may be held at the discretion of the divisional officers. The Fall Meeting of the parent society will be held as planned in Chicago the week of September 10.

Thermoid to Acquire Grizzly

Negotiations are currently being conducted under which the Thermoid Co., of Trenton, N. J., will acquire the plant and equipment of the Los Angeles, Calif., plant of the Grizzly Manufacturing Co., as well as the patents held by that company on various oil field, industrial rubber and aviation products. Thermoid acquired stock control of the Jos. Stokes Rubber Co. about two years ago. Grizzly also operates a plant at Paulding, Ohio.

Wacs Perform Needed Jobs

Releasing a pilot balloon, whose speed and course she will follow by means of the instrument before her, will tell the WAC weather observer in the accompanying illustration the speed and direction of the wind at various altitudes. Accurate weather data is indispensable to operations of the Army Air Forces. This is only one of hundreds of jobs members of the WAC are doing. The WAC needs more women—to take care of the wounded, to work in supplies, to help keep down the drafting of fathers. Even when Germany is forced to her knees the Army will still need enlistments. Special civilian advisory committees have been set up in the nine Army Service Commands to help recruit 48,000 additional WACS.

Micronoil Moldeze-R

Micronoil Moldeze-R, a material which is said to provide a new treatment for molds used in the rubber industry, and which is a variation of a similar material which has been finding favor in the molding of plastics products, has been announced by Protective Coatings, Inc., Detroit 27, Mich. Moldeze-R is described as a combination lubricant and metal treatment. The soluble liquid is brushed or sprayed into the heated mold. The carrying agent quickly evaporates, leaving the active elements in and on the surface of the mold. According to the manufacturer, Moldeze-R prevents adherence of the rubber to the mold, reduces the number of rejects, gives a glossy finish to the molded product, and inhibits corrosion since molds are protected when storaged.

Renames Plastics Unit

The Celanese Corporation of America, New York City, has announced that the Celanese Celluloid Corp., its selling organization for the plastics products made by the parent company, will henceforth be known as the Celanese Plastics Corp. No change in personnel was made.

New Thiokol Molding Powders

A new series of Thiokol molding powders, which become vulcanized at 300° to 360° F. to form a tough, resilient elastic solid possessing the physical properties of vulcanized rubber, but having in addition excellent resistance to solvents, greases, oils, fuels, sunlight, ozone and atmospheric oxidation, has been announced by the Thiokol Corp., Trenton, N. J. These compounds are said to remain flexible at temperatures below —50° F. and to be serviceable in temperatures in excess of 220° F. The properties of the finished compounds can be varied over a wide range of hardness through compounding. For the present, the molding powder is being manufactured at a Shore hardness of 60. In considering the properties of parts molded from the new powders, Thiokol suggests they be thought of in terms of soft vulcanized rubber rather than hard, rigid plastics.

Dayton Rubber Plans Offering

Dayton Rubber Mfg. Co., Dayton, Ohio, has filed a registration statement with the Securities and Exchange Commission covering 60,000 shares of common stock, of which 50,000 shares will represent new financing by the company and the remainder a sale of holdings of J. A. MacMillan, chairman, and his wife. Lehman Brothers, New York City, is expected to underwrite a public offering of the shares. Proceeds received by the company will be used to complete at an additional cost of approximately $1,000,000 an expansion program which has cost $3,739,387 during the last five years.

Name Tire Repair Committee

An advisory committee consisting of eight members whose companies produce tire and tube repair materials has been appointed by OPA. Members of the committee include E. A. Schneider (Miller), Albert Buxbaum (Buxbaum), Charles W. Yelm (Gates Rubber), Ernie Leach (General Tire), T. J. Bagley (Hollingshead), W. C. Holmes (Dill Manufacturing), Griffith E. Oliver (Oliver Tire), and B. C. Eberhard (Goodyear). An organization meeting will be held at the OPA regional office in Chicago on January 29 and 30.

Buffalo Meets January 25

The next meeting of the Buffalo Rubber Group will be held on Thursday, January 25, at the Hotel Lenox in Buffalo, N. Y. Ralph B. Symons, of the Wilmington Chemical Corporation, New York, will speak on "Sulfur-Reactive Plasticizers for the Rubber Industry," and H. Walter Grote, midwest representative of the same company, will present some of his feats of legerdemain under the grandiose title of "Presentation of Streamlined Intimate Magic."

FINANCIAL NEWS

FIRESTONE TIRE & RUBBER REPORTS NET OF $16,310,845

Based on record sales of $651,410,411, an increase of 19% over the $545,389,601 reported in the previous fiscal year, the Firestone Tire & Rubber Co. has reported a net profit of $16,310,845 for the year ended October 31, 1944. The net profit was arrived at after providing for all expenses, including $13,866,775 for depreciation and amortization and $58,727,714 for taxes, and after adding $2,500,000 to the reserve for contingencies. The profit is equivalent to $7.34 a common share and compares with $15,183,383, or $6.90 a share, for the previous year.

In issuing the report, Firestone made it clear that renegotiation of war contracts for 1943 was completed and repayment to the government of the amount agreed upon was made within the year from the provision made in the previous year. Further voluntary price reductions were made during the year and it was deemed unlikely that any repayment should be necessary as a result of renegotiation for 1944. Accordingly, no such provision was made in the current report.

The report also stressed the fact that government restrictions on the shipment of rubber products to foreign countries remained in force during 1944 and therefore continued to limit export business. However, through Lend-Lease channels, Firestone secured a substantial volume. Firestone plants in England, Canada, South Africa, India, Brazil, and Argentina operated on a satisfactory basis and net profits of $3,793,722 from foreign subsidiaries were included in earnings. The company's total investment in foreign countries is now figured at $33,686,676.

Mention was also made in the report that in January, 1944, Firestone sold $45,000,000 of new 4½% preferred stock and with the proceeds redeemed the outstanding 6% preferred stock. To meet financial requirements through the period of settlement of war contracts and into the period of production for civilian needs, the company arranged a three-year $75,000,000 revolving credit with its banks. On October 28, 1944, stockholders amended the articles of incorporation so that the company may broaden the scope of its activities.

Reference was made to the agreement entered into between tire manufacturers and the government under which an expansion program of approximately $75,000,000 was determined to meet the increased requirements for large tires used on combat vehicles, airplanes, trucks, busses and farm implements. Firestone's portion of this program, according to the report, was approximately $15,000,000 to increase the capacities of its Akron, Memphis and Los Angeles plants. In addition, the company is building and will operate for the government a plant in Des Moines, Iowa, for the production of large military tires.

Pharis Tire & Rubber Co.

Year Ended October 31: Net profit of $412,660, which is equal to $1.96 a share on 210,000 shares, which compares with a net of $209,991, or 95c each on 220,000 shares, in the previous fiscal year. Net sales for the period are listed at $11,830,519, which compares with $8,443,815 for 1943. The report stated that operations of the Carlisle Tire & Rubber Co., Carlisle, Penna., for the ten months ended with October have been included in the consolidated statement of profit and loss and its profit prior to the date of acquisition, as of March 1, 1944, has been eliminated from consolidated earnings.

Dayton Rubber Co.

Year Ended Oct. 31: Net income of $781,716, after deductions of preferred dividends, which is equal to $3.90 a share on common stock outstanding prior to refinancing, and which compares with a net of $620,622, or $2.99 a share, in the previous year. Net sales were $20,094,000, a gain of 12.3 per cent over the preceding fiscal year, and earnings, before taxes, were $2,458,716, which compares with the $1,604,755 earned in 1943.

Lee Rubber & Tire Corp.

Year Ended Oct. 31: Net income of $1,299,849, after all charges, including provision of $3,692,708 for taxes, which is equal to $5.38 a share, and which compares with $1,241,934, or $5.14 a share, reported for the previous fiscal year, when taxes amounted to $2,583,697. Net sales for the period amounted to $27,448,418, an increase over the $25,236,489 reported for 1943.

Seiberling Rubber Co.

Year Ended Oct. 31: Net profit of $510,145, which is equal to $1.34 a share, and which compares with $609,301, or $1.70 a share, reported for the previous fiscal year. Net sales amounted to $22,904,820, against $18,273,872.

Norwalk Tire & Rubber Co.

Year Ended Sept. 30: Net profit of $156,142, which is equal to 62c a common share, which compares with a net of $162,165, or 65c a share, for the preceding fiscal year.

Cable Suit Is Settled

All civil claims against nine cable manufacturers and [illegible] of their officers, arising out of [illegible] conspiracy in submitting bids to the government, were settled in the Federal Court in New York on December 29. Fines of $70,000 were imposed previously against corporate defendants that had pleaded nolo contendere to criminal charges based on the same facts, and the government offered to dispose of the civil claims if the companies concerned would accept the Navy Department's determination of what was a reasonable return for performance of all of the contracts involved and would return everything in excess of such reasonable return. Since returns were made on this basis the civil claims were renounced by the government. Defendants in the original action included Okonite, Collyer Insulated Wire, General Cable, Anaconda Wire & Cable, National Electric Products, and Phelps Dodge Copper Products.

Guayule Cultivation in Russia

A factory for the processing of guayule rubber is scheduled for completion in Azerbaidzhan, Russia, within the next month or two, according to reports reaching the Bureau of Foreign & Domestic Commerce of the U. S. Department of Commerce. Farmers in this small southern Republic are being encouraged to grow guayule, and results indicate that soil and climate are particularly well suited for its cultivation. The yield of pure rubber per hectare is said to be nine times that from the more familiar kok-saghyz. The rubber industry of the Soviet Union more than fulfilled its 9 months' production plan, and output in September was 12.7 per cent higher than in August. Requirements for the Army were amply met, and particular success was registered in tire production and in the output of technical rubber and asbestos goods.

NAWMD to Hold Conference

The National Association of Waste Material Dealers, Inc., will hold a Waste and Secondary Raw Material War Industry Conference in Chicago on March 19, 20 and 21. Headquarters for the conference will be the Sherman Hotel and the program will be built around the Association's slogan: "Waste Materials Can Win the War — Keep Them Moving." Details of the program will be announced shortly.

Shaw Executives to Visit U.S.

R. O. Shaw, works director of Francis Shaw & Co., Ltd., of Manchester, England, and G. Siddall, one of the technical directors of that company, were scheduled to sail from England about January 10 for this country. They planned to visit some of their American friends in the rubber industry and discuss improvements in processing techniques which have been developed both during the war and since their last visit to America in 1938.

New Nitrile Plasticizer

NTD-181.5-B, a new nitrile plasticizer especially recomm[illegible] all Buna N types of synthetic ru[illegible] and all vinyl resins, has been introduced by the Chemical Division of Armour & Co., 1355 West 31st St., Chicago 9, Ill. The new plasticizer is reported to process readily in either milling, extruding or calendering, to have good aging properties both before and after curing, to be compatible with all types of synthetic rubber as well vinyl type resins, and to neither retard nor accelerate vulcanization. According to the manufacturer, with NTD-181.5-B vulcanizates can be compounded to have almost any modulus that may be desirable, almost any tensile strength, and excellent low-temperature flexibility. Although the new plasticizer is being widely used in mechanical rubber goods, its properties lend it to many other rubber applications.

Approve U. S. Rubber Pact

Ten consolidated actions in the Supreme Court of New York, New York County, by Arthur Diamond and others against present and former directors and officers of the U. S. Rubber Co. have been settled with court approval, according to a statement issued by that company. The settlement also embraced claims set forth in other pending actions. Terms of the settlement provided for dismissal and release of all pending claims, and are expected to result in a saving of approximately $50,000 a year to the company. The original suit alleged domination of U. S. Rubber by DuPont and also excessive or improper compensation to certain officers, agents and employees.

Hewitt to Enter Consumer Field

According to a statement issued by Thomas Robins, Jr., president, the Hewitt Rubber Corporation, of Buffalo, N. Y., which has been manufacturing industrial rubber goods for the past 80 years, will enter the field of consumer goods with latex foam and molded rubber products in the post-war period. The company will produce latex foam for use in such products as mattresses, upholstered furniture and automobile seats. Molded goods will be made largely by an entirely new type of injection molding process which the company has said to have perfected recently. The trade name of the latex foam, it is understood, will be "Rest Foam."

Acquires Alkali Company

The Columbia Chemical Division of the Pittsburgh Plate Glass Co. has acquired the Pacific Alkali Co., which has operated a plant at Bartlett, Calif., for the past eighteen years. Columbia Chemical officials stated that the personnel of Pacific Alkali will be retained.

From Patton to Totten

Under the above head, *Business Week* has recently revealed that whole bargeloads of battle-damaged tires are arriving at Fort Totten, N. Y., from European war fronts for repairs and reassigment to service. Classified at the rate of 1,500 daily, the casings go through the Fort's new 15-acre salvage center where soldiers and private contractors fit them for reuse—if possible. Out of more than 75,000 tires handled since mid-September, Fort Totten has reissued 25% of the better ones for Army service while another 25% went into the scrap rubber heap. Those in between are going to the Treasury Department's surplus disposal office as-is for sale in civilian markets.

Brazilian Tire Production

Production of tires and tubes in Brazil in 1943 totaled approximately 460,000 and 300,000 units, respectively, and the output of tires in 1944 is estimated between 460,000 and 500,000 units, according to the U. S. Bureau of Foreign & Domestic Commerce. While the majority of these tires are used locally, considerable numbers are exported. During the first quarter of 1944, nearly 30,000 tires and slightly more than 21,000 tubes were shipped out of the country. Export quotas for the second quarter of the year were fixed at a similar number of tires and tubes.

Tompkins Back in Washington

L. D. Tompkins, who served under William Jeffers and Col. Bradley Dewey as a Deputy Rubber Director during the existence of the Office of the Rubber Director, has returned to Washington as a special assistant to James F. Byrnes, head of the Office of War Mobilization and Reconversion. Mr. Tompkins, formerly a vice-president and still a director of the U. S. Rubber Co., will coordinate the efforts of the various government agencies dealing with the rubber program and will give particular emphasis to the critical shortage of tires.

Hawaii Producing Crude Rubber

The fact that Hawaii is currently producing natural rubber has been revealed by the B. F. Goodrich Co., Akron. N. F. Weber, former Akron resident, who is now manager of the Goodrich international division in Honolulu, recently airmailed a sample of smoked sheet to the Akron offices. The Hawaiian rubber is the only tree rubber being grown in American territory, except for experimental plantings in the Miami Gardens in Florida.

Open Development Laboratory

The new alumina development laboratory of Aluminum Research Laboratories, which was designed and built to provide pilot plant capacity equipment primarily for the development of improved operating technique, economy in use of materials, and improved quality of product in the Alcoa combination process for the extraction of alumina from low grade bauxites, was formally opened on December 14. The development laboratory, which cost $750,000, is located at the East St. Louis, Ill., works of the Aluminum Ore Co. Hydrated alumina, in a finely divided state, is widely used as a reinforcing pigment for rubber and plastic compositions.

Benner Leaves Carborundum

Dr. R. C. Benner, director of research for the Carborundum Co., Niagara Falls, N. Y., for the past year, announced his retirement from that company as of January 1. Dr. Benner was graduated from the University of Minnesota in engineering in 1902, later taking a Ph.D. at the University of Wisconsin. During his business experience of 40 years he has been a patent attorney, a registered engineer, and a professional inventor. After a brief rest, Dr. Benner intends to do consulting research work on special problems. He resides at 460 College Ave., Niagara Falls, N. Y.

Rubber in the Everglades

Elliot E. Simpson, of the L. Drexsage Company, New York City, who was reported to have discovered rubber in the Florida Everglades last March, is continuing his investigations of rubber in that area. On the first expedition, seven species of rubber-bearing trees were said to have been found. Six additional species were uncovered on a second expedition. The party accompanying Mr. Simpson on the first expedition was reported to have included Karl W. V. Knix, of Akron, and Chico Marx, stage star.

New U. S. Rubber Plant

U. S. Rubber Co. has announced that it will start manufacturing operations at its new plant in Burlington, N. C., about March 1. Yarns for surgical stockings for the armed forces will be scheduled first for production. On completion of all necessary war work, a long range program will be inaugurated to supply "Lastex" for the hosiery trade.

The validity of the Foxboro Stabilog Controller patent, held by Foxboro Co., Foxboro, Mass., was upheld recently in a decision handed down in the U. S. District Court for the Western District of New York. The court also recognized its infringement by several types of instruments sold by the Taylor Instrument Companies.

CANADIAN NEWS

The gross value of products manufactured by the Canadian rubber industry in 1943, the Dominion Bureau of Statistics reports, aggregated $130,158,000, as compared with $122,231,000 in the preceding year, an increase of $7,927,000.

Establishments manufacturing rubber tires, footwear and other rubber goods numbered 51 in 1943, 30 plants being located in Ontario, 17 in Quebec, and 1 each in Manitoba, Saskatchewan, Alberta, and British Columbia. These plants had a capital investment of $73,550,768, furnished employment to 15,913 persons who received $25,342,508 in salaries and wages, and produced goods valued at $130,157,780, from material costing $68,297,492.

The industry is practically confined to the Provinces of Ontario and Quebec. The plants in Ontario employed over 87 per cent of the capital, almost 72 per cent of the persons engaged in the industry, and produced over 77 per cent of the entire output. The rubber industry also forms an adjunct of considerable importance to the cotton yarn and cloth industry which supplies it with tire and other fabrics. Besides supplying the domestic market, the industry contributes materially to the export trade of Canada.

There was a decrease in the selling value of tires and inner tubes produced, the value of production dropping from $66,831,055 in 1942 to $64,720,133 in 1943. The volume of footwear decreased from 14,768,965 pairs in 1942 to 11,984,908 pairs in 1943 and the value decreased from $19,858,565 to $14,495,794. The miscellaneous section of the industry, which includes such products as heels and soles, belting and hose, medical and druggists' supplies, mechanical goods, etc., increased its production from $35,541,782 in 1942 to $50,941,853 in 1943. For the rubber industry as a whole, there was thus an increase of $7,926,378 in the value of production. There was also an increase of $6,720,946 in the cost of the materials used and an increase of $1,929,358 in the amount of salaries and wages paid.

Of the three main classes of products manufactured in this industry in 1943, rubber tires and tubes accounted for almost 50 per cent of the total, rubber footwear for over 11 per cent, and other rubber goods for the balance or almost 39 per cent. Compared with the previous year, the output of tires and tubes decreased in value to $2,110,922 or over 3 per cent, footwear decreased by $5,362,771 or over 71 per cent, and other rubber goods increased by $15,400,071 or over 43 per cent.

Rubber Controller Alan H. Williamson warned in a prepared statement issued on January 6 that the shortage of civilian tires is likely to become "still more acute" within the next few months because of the step-up in military tire production. He said that tire rationing representatives throughout Canada have been instructed to continue to screen all applications for tire permits so that only the most necessary vehicles be supplied until the situation improves.

At the same time the Controller revealed that one of the first steps taken to boost military tire production was the cancellation of plans made three months ago for an increase in the output of tires urgently needed for essential civilian users, such as doctors, nurses, police, fire fighters, war plants and milk truckers. "Even the cancellation of these plans may not prove enough," said Mr. Williamson. "Unless the situation at the battlefronts improves rapidly, we may not be able to maintain the 1944 rate of civilian output —a rate which did not meet all essential demands."

Canadian tire workers pledged themselves to produce 60,000 extra tires in the next three months for Allied armed forces at a conference of government and union officials held in Montreal on December 30. Details regarding acquisition of additional manpower are to be worked out at future meetings, but it was announced that the highest priority for temporary workers will apply to all workers in the tire industry.

Plants at Hamilton, Kitchener and Toronto are already producing more tires than the Canadian forces require, according to Joseph MacKenzie, Canadian Director of the United Rubber Workers of America. Added production will go into an Allied pool along with extra production from United States plants.

Production of passenger tires will not meet over-all demand for three years after the end of the European war, according to a talk made by J. E. Partenheimer, of the Atlas Supply Co., Newark, N. J., before the Royal Canadian Institute in Montreal on December 19. For the first year, he predicted, between 65,000,000 and 80,000,000 tires will be made to supply civilian cars, trucks and airplanes.

In the post-war period, Mr. Partenheimer said, natural rubber will be used for large truck tires while synthetics will look after the demands of the average motorist and the small truck driver, and "so long as we can get at least 10 per cent crude rubber into a synthetic tire, you will have an excellent tire." He emphasized the point that this does not mean the end of natural rubber, which is still the best material for tires, but "synthetic has its uses and in some cases it is better than the natural rubber."

C. C. Thackray, vice-president and a director of the Dominion Rubber Co., Ltd., Montreal, has been elected executive vice-president of that company. Mr. Thackray joined Dominion Rubber in 1920 and has held various executive positions. In 1933 he became general manager of the mechanical and footwear manufacturing divisions and in 1939 became a vice-president in charge of those divisions. He was named a director in 1942.

Reference was recently made in these columns to the fact that the British Rubber Co. of Canada, Ltd., was still operating a footwear plant in St. Laurent, Quebec. It has been called to our attention that the St. Laurent plant was completely destroyed last June by a fire which spread from the adjacent plant of the Industrial Glass Co. Manufacturing facilities are being increased at the company's Lachine factory and all footwear production will be concentrated at the Lachine site. Two new buildings for manufacturing purposes have already been completed at Lachine and another for factory offices, laboratory and machine shop is in the course of construction. An addition to the mill room is also being made to give increased mixing capacity.

In a New Year's message to shareholders, A. G. Partridge, president of the Goodyear Tire and Rubber Company of Canada, Limited, stated that the company has completed its 34th year on a profitable basis and that net earnings will be approximately the same as in the previous year. The annual meeting will be held early in 1945.

Net for 1943 amounted to $12.51 on the preferred and $5.59 on the common, including the refundable portion of the excess profits tax, with $4.51 retained. Dividend payments in 1943 amounted to $4.50 on the common, with an increase to $5 for 1944, including an extra of $2.50 paid on December 31.

Application for listing the issued and outstanding 100,000 common shares without par value of Canadian Tire Corporation, Limited, has been granted and the shares were posted for trading on the Toronto Stock Exchange on January 2. Canadian Tire Corporation, Limited, was incorporated in 1927 and it succeeded the Hamilton Garage and Rubber Company, established some 18 years earlier. Head office is located at 837 Yonge Street, Toronto. On August 10, 1944, the company declared its initial quarter dividend of 20 cents per share on the common stock, being at the rate of 80 cents per annum.

The company carries on the business of a retail, wholesale and mail order distribution of its own special brands of goods, together with a complete line of accessories and replacement parts for cars, a wide range of tools, sporting goods, bicycles, paints, varnishes, etc.

LOS ANGELES NEWS

At a meeting of the board of directors of the Los Angeles Rubber Group, Inc., on January 8, a tentative course of procedure for the ensuing year was mapped out. The plans will be presented to the Group as a whole at an early meeting.

Vic Vodra, local representative of the R. T. Vanderbilt Co., was slated to make his periodical business trip to New York this month leaving Los Angeles on January 18.

There was no meeting of the Los Angeles Rubber Group in January due to the nearness of the meeting date, the first Tuesday in the month, to New Year's Day. The February meeting, however, is expected to be a very large one as it is to be a Boy Scout night with a father-and-son atmosphere. While several features are planned, all good ones for the occasion, especial attention is expected to be drawn to a display of model airplanes, said to be the most novel and complete in the world. Brazilian pictures will also be shown. The new chairman, R. E. Hutchinson (Firestone), will take over the gavel at this meeting.

Fred Woerner who has been chief chemist for Los Angeles Standard Rubber, Inc., for a few years resigned his position effective the first of the year and has taken a similar position with the Ray R. Reeves Rubber Company in San Clemente. This latter company, located in a coast town half way between Los Angeles and San Diego, has shown remarkable growth since its founding.

A large number of Los Angeles men attended the Christmas party of the Northern California Rubber Group, December 19, at the Hacienda in Orinda near Oakland. They were in no wise disappointed. The meeting, ladies present, was attended by about 150 people, and consisted of a dinner-dance, a business session, etc. The new chairman, inducted that night, is Rus Kettering of the Oliver Tire and Rubber Company. He succeeded Leonard Boller, now a resident of Los Angeles. There were numerous prizes awarded and favors for the ladies. The corsages for the ladies were unique—miniature fir trees with tiny cones, tied with a red ribbon.

Courses being given at U.S.C. by Vic Vodra (Vanderbilt) and Fred Woerner (Reeves) will conclude sixteen weeks of weekly evening sessions late this winter. Vodra's class, studying the subject of practical compounding and processing of synthetic rubber, conducted as a symposium, has attracted 22 eager students. Woerner's has done the same. Vodra says he is himself astounded at the progress made since last year when he taught a similar class. Very little material presented even twelve months ago could be used this year, he states.

The Los Angeles Rubber Group will miss its long time host at the Mayfair Hotel when convening in February. This host, Ray Sexton, in charge of dining room and banquet service at the hotel for many years, has resigned and gone to the Town House, a fashionable hotel on Wilshire Boulevard. Ray seemed "just like one of the boys" and entered into their fun with a spirit of true comradeship. Genial, handsome, and a good public speaker in his own right, he was able always to put a nice finishing touch to the year. The new host comes just as highly recommended, however, and the members contemplate many years of pleasant association with him.

Charley Churchill, the new secretary of the Los Angeles Rubber Group, reports the new Year Book well along toward the day when it can go to press. There will be 44 pages and a number of new features, details of which will be given in a later issue.

Sol Goldenberg, of the Tire Clearing House, Los Angeles, is the father of a fine baby girl, almost a New Year's present.

Art Swan, formerly with the W. J. Voit Rubber Corporation, is now with the Arrowhead Rubber Company.

Carl Zimmerman, formerly with Goodyear, now an electrician in the Army Air Corps, after suffering severe burns in the South Pacific was given 13 pints of blood plasma, and is reported to have started on his way to health again.

Triton R-100 in GR-S-Black

The dispersing agent which makes possible uniform distribution of carbon black in the GR-S-Black developed by the General Tire & Rubber Co., which is now in production at the plant operated by that company at Baytown, Texas, for the government, has been revealed as Triton R-100, a product of the Rohm & Haas Co., Philadelphia, Penna. The carbon black is mixed with a water solution of Triton R-100 and the mixture then added to the synthetic latex when it is in emulsion form. By decreasing the viscosity of the carbon black slurry, the dispersing agent is said to make handling easier and to avoid mechanical difficulties.

Montreal Group Hears Perry

Thomas E. Perry, of the Resinous Products & Chemical Co., Philadelphia, was the principal speaker at the joint meeting of the Montreal Rubber & Plastics Division of the Society of Chemical Industry and the Chemical Institute of Canada, held in Montreal at the Ritz-Carlton Hotel on December 13. Over 100 members and guests attended the meeting. Mr. Perry discussed "Wood Improvement," and outlined the various methods of utilizing the wide availability of wood while avoiding some of the disadvantages inherent in its structure. He also referred to methods of combining wood layers with other materials, including rubber, plastics, cloth, paper and metal. The talk was liberally illustrated with slides. Prior to this presentation, Dr. R. V. V. Nichols spoke for a few minutes on the organization and aims of the newly-formed Chemical Institute of Canada.

New Plasticized Gilsonite

Wilmex M, a plasticized gilsonite, has been introduced by the Wilmington Chemical Corp., 10 East 40th St., New York City. Although natural gilsonite is a tough hydrocarbon of high melting point which is extremely difficult to disperse in natural or synthetic rubber, the new plasticized gilsonite is reported to disperse readily. In Wilmex M, according to the manufacturer, the gilsonite is plasticized with a sulfur-reactive hydrocarbon that, in effect, cures out to leave the tough gilsonite dispersed throughout the vulcanized rubber mass, thus making the material an advantageous processing aid.

New Rubber Compounding Process

A new rubber compounding process which reduces the danger of heat failure of heavy-duty synthetic rubber tires has been announced by Firestone. The new process covers the incorporation of magnesium sulphate into mixtures of latex and zinc oxide so that equal parts of the two materials can be mixed together and coagulated easily and quickly. Latex to which zinc oxide has been added does not coagulate to any extent and the new magnesium sulphate process overcomes this difficulty.

Snug-Fit Rubber Clogs

Tingley-Reliance Rubber Corp., Rahway, N. J., has introduced a new line of snug-fit rubber clogs for men. Molded in one piece, the clogs feature the sandal strap principle molded in the rubber, extending from the base of the arch to the top of the back of the rubber, thus preventing the rubber from coming off or flopping at the heel under any service conditions. The new clogs are featherweight, foldable, and cleans both inside and out.

OBITUARIES

Ferdinand F. Dugan

Ferdinand F. Dugan, midwest representative of the U. S. Rubber Reclaiming Co. for the past twenty-five years, and a member of the firm of Dugan & Campbell, sales engineers, died at his home, 1090 West Market St., Akron, Ohio, on December 27, at the age of 55, after an illness of eleven weeks. Mr. Dugan, or "Bill" Dugan as he preferred to be called, was one of the most widely known members of the rubber industry in the Akron area, and sincerity was one of his most outstanding qualities.

Born in Des Moines, Iowa, Mr. Dugan was graduated from the University of Iowa in 1912 and shortly thereafter joined the Des Moines branch of the Goodyear Tire & Rubber Co. Two years later he was transferred to Akron and became sales personnel manager of the company. In 1922 he became vice-president of the former Denman-Myers Cord Tire Co., of Warren, Ohio, but returned to Akron in 1924. In 1931 he formed the firm of Dugan & Campbell.

An outstanding patron of the arts, and a talented piano player, Mr. Dugan was one of the best known figures in music circles in Akron and Cleveland. He was one of the few out-of-town members of the Hermit Club of Cleveland, a noted organization of men talented in the arts. He was also a trustee of the Akron Civic Opera Guild, Inc. A popular clubman, he was a member of the Portage Country, Akron City and Rotary clubs. He was also a member of several Masonic bodies and belonged to Trinity Lutheran Church.

Funeral services were held on December 30, with interment in Glendale Cemetery. A widow and married daughter survive.

George F. Chapman

George F. Chapman, who was connected with the Boston Woven Hose & Rubber Co., Cambridge, Mass., in an official capacity for many years prior to his retirement in 1938, died recently at his home in Plymouth, Mass. He was 84 years of age. Born in Canton, Mass., Mr. Chapman was a graduate of the Massachusetts Institute of Technology. In 1918 he joined a rubber reclaiming plant at Plymouth, Mass., in the capacity of superintendent, and from 1929 until his retirement in 1938, he was an associate in engineering work for the Cambridge plant of Boston Woven Hose. Services were held on September 6 at the First Congregational Church of Canton, followed by burial in the Canton Corner Cemetery. He is survived by a son and two daughters.

Waldemar Kops

Waldemar Kops, president of the Rubber Corporation of America, which maintains a factory in Brooklyn, N. Y., and executive offices in New York City, died in Mount Sinai Hospital, New York, on January 13, following an operation. Mr. Kops was president of the hospital. He was also president of Kops Brothers, corset manufacturers of New York. He was 55 years of age.

Active in both civic and charitable affairs for many years, Mr. Kops was a director of the Research Council of the New York City Department of Health, a trustee of the Baron de Hirsch Fund, and a trustee of the Federation for the Support of Jewish Philanthropic Societies of New York City. He had been a member of the board of trustees of Mount Sinai Hospital since 1924, was elected a vice-president in 1938, and was chosen as president last October. A Lieutenant-Colonel in the U. S. Chemical Warfare Service in the last war, he was active in the development of gas defense material.

Funeral services were held on January 15. A widow, a son and a daughter survive.

William C. Metlin

William C. Metlin, vice-president of the Akron Belting Co., well known in Akron rubber circles, died on January 2 in St. Thomas Hospital, Akron, after being stricken with a heart attack while on the way to his office. He was 72 years of age. Born in Akron in 1872, he received his primary education in that city's public schools and began his career with Akron Belting in 1886 as an apprentice. He served in every capacity in the factory and in 1914 was made vice-president, retaining that post until his death. Funeral services were held on January 5, with interment in Glendale Cemetery. A widow, son and daughter survive.

Mrs. Edward O. Hutchens

Mrs. Edward O. Hutchens, wife of the well-known president of the Utility Manufacturing Co., who had served as secretary of that firm for many years, died in Deaconess Hospital, Milwaukee, Wisconsin, recently, after a brief illness. She was 61 years of age. Born in Appleton, Wisconsin, Mrs. Hutchens had lived in Milwaukee most of her life. Besides her husband she is survived by one son, Lt. Edward J. Hutchens, now on duty with the Army in the South Pacific, two brothers and two sisters.

Ralph S. Leonard

Ralph S. Leonard, assistant treasurer of the Firestone Tire & Rubber Co., died on December 26 at his home, Blue Hill on Medina Road, Akron, Ohio, at the age of 68, following a long illness. Mr. Leonard lived most of his life in Ohio, receiving his education in Norwalk public schools, Denison University and Ohio State University. Before coming to Akron in 1919 to join Firestone, he was associated with the Glidden Paint Co. at Cleveland. Well known in industrial, social and club groups in Akron, Mr. Leonard was one of the most familiar figures at the Portage Country Club, serving at one time on the board of directors. He was also active in church work, a leader of Boy Scout activities, and a trustee of the Y.W.C.A., and at one time was president of the University Club. Funeral services were held on December 28. A widow and two sons survive.

Warren K. Williams

Warren K. Williams, superintendent of the new design, equipment and construction division of the B. F. Goodrich Co., Akron, died on December 11, of a heart attack at his home in Silver Lake, Ohio. He was 52 years of age. Born in Nebraska, Mr. Williams was a graduate of the Carnegie Institute of Technology, class of 1916, and served as a lieutenant with the field artillery overseas in World War I. Prior to joining Goodrich, he was employed by the Vaughn Machine Co. He was a member of the Ohio Society of Engineers and of the American Society of Mechanical Engineers. He served as commander of the Silver Lake Post 364, American Legion, and was a member of the Homewood Lodge, Free and Accepted Masons, of Pittsburgh. Funeral services were held on December 14 in Cuyahoga Falls, followed by burial in Oakwood Cemetery. A widow, son, and daughter survive.

R. R. Drake

R. R. Drake, service manager for the Corduroy Rubber Co., Grand Rapids, Mich., since 1927, died on December 8 in the Butterworth Hospital, Grand Rapids, at the age of 66. Prior to his association with Corduroy, Mr. Drake had been with the old Diamond Rubber Co. and later served as national general service manager for the U. S. Rubber Co. for twenty years. He was a member of the New York Athletic Club, the Kismet Temple Shrine of Brooklyn, and the Grand Rapids Peninsular Club.

A new fabric, to be known and promoted as "Fabulon," has recently been introduced by the I. B. Kleinert Rubber Co., New York City. A member of the rayon family, this fabric is exceedingly light in weight, highly absorbent, and is equally strong when wet as when dry. At present, it is being used in the manufacture of parachutes.

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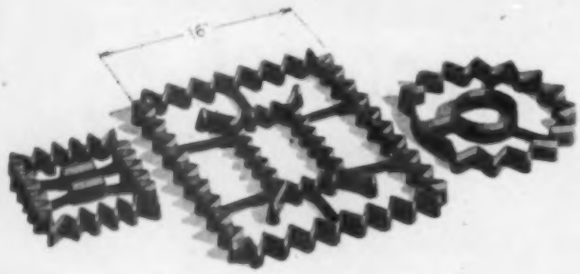

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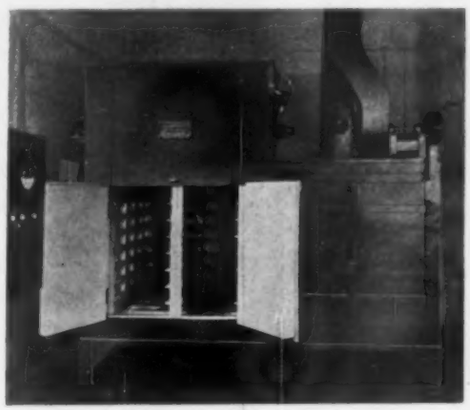

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Door sizes range from 3 feet wide by 3 feet high to 5 feet wide by 6 feet high, and working depth from 3 to 6 feet. The temperature range is from 150° to 900°F., with a tolerance of ±2°. Despite the fact that the oven is direct gas fired, a seeming hazard in the evaporation of large volumes of inflammable and explosive materials, it has been proved to be perfectly safe and has insurance company approval.

The oven illustrated is a standard size (4-foot by 5-foot door and 4-foot depth) with a preheating zone added, the latter heated by exhaust air from the oven proper. It is used to dry fabricated paper parts which have been dipped in a finishing solution consisting of approximately 50 percent alcohol and 50 percent solid matter. On this job it has reduced drying time from 25 minutes to 5 minutes, has cut drying costs substantially, and has increased hardness of the finish, at the same time relieving brittleness which was previously a characteristic of the finish.

These ovens can be used not only for alcohol but for acetone, naphthas, methyl-ethyl-ketone and many other highly volatile solvents, and can also be converted without delay for other types of drying, finishing, heat treating or heat processing where materials can be handled in trays, jigs or baskets. It is especially suited to dense loads where air stream resistance is high. Completely automatic controls, of the expansion recording thermometer type or the millivoltmeter type, either air or electrically operated, are supplied to suit the user.

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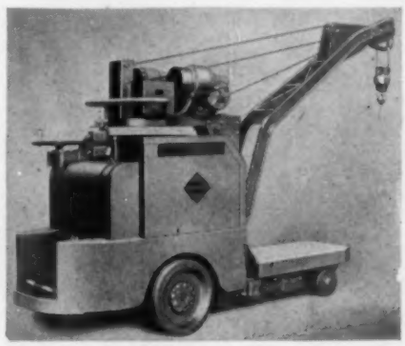
New Combination Crane Truck

The new model L-11C Combination Crane Truck recently announced by the Elwell Parker Electric Company, Cleveland, Ohio, has improved operating characteristics due to the addition of a separate motor for raising and lowering the boom. In previous models a single motor served to raise and lower both boom and



hook, by means of a ratchet boom adjustment which was actuated when the lift hook was pulled up against the boom. By providing a separate motor for each function the operator is given a greater freedom of choice in manipulating the load.

The combination crane truck is a 4-way truck, serving as a lift-truck, a load carrier, crane and tractor. It loads itself either by picking up skid loads with the lift platform, or by lifting heavy parts and placing them on the platform for transport. As a tractor it pulls trailer cars, which may be loaded by means of the crane. The crane may be made available for heavy lifting at points where there are no overhead cranes. This model has a capacity of 6000 pounds on the platform, 2000 pounds on the hook at 42-inch radius, and 1000 pounds on the hook at 84-inch radius. It will travel at 6 miles per hour with no load and 5 miles per hour with full load under normal conditions. The platform is deeply flanged to insure rigidity and has three point positive support that assures load stability at all times.

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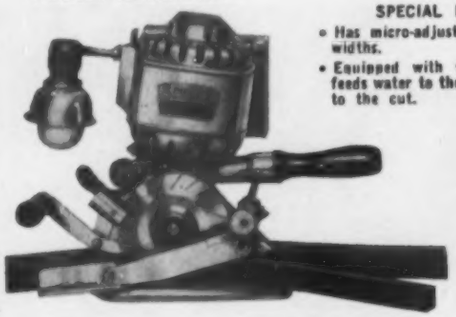

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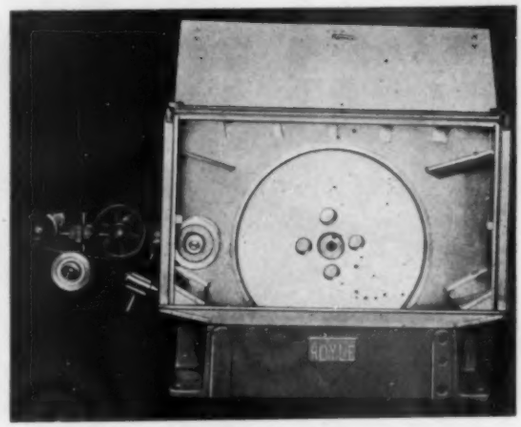
Capstan for Resin Insulated Wire

A new 36-inch high speed capstan for resin insulated wire has been developed and introduced by the firm of John Royle & Sons, Paterson 3, N. J. Illustrated herewith in an open position, the new capstan has a number of important features including the following: Stainless steel watertight enclosure, total enclosure permits higher wire speeds, more efficient wire puller stabilizes wire speed, secondary idler pullets guide wire across capstan preventing rubbing and permitting greater quantities of wire to be cooled simultaneously, all bearings located outside of enclosure to prevent contact with water, built-in air wiper, full size folding side assures maximum accessibility. In addition, the new capstan is quiet running and all interior surfaces which are touched by wire or spray are of aluminum or corrosion-resisting metal to withstand the chemical reaction of the various resins.



Precision Needle Jig Fixture

A needle jig fixture, designed to produce a uniform hole in the De Mattia flexing test specimen prior to flexing, has been developed by the Precision Scientific Co., 1730 No. Springfield Ave., Chicago, Ill. As seen in the accompanying illustration, the apparatus consists of a small cast brass base and a support for holding the needle holder. The latter is returned to its original position by a self-contained spring. A conveniently sized knob on the top is depressed to produce the puncture in the test specimen. The base is finished with a Kem-Resist finish and chromium.

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ORVUS is a sulfated alcohol type cleanser—not a soap.

REVIEWS

BOOKS

Annual Report on the Progress of Rubber Technology: 1943. (Vol. VII). Edited by T. J. Drakeley. Published by the Institution of the Rubber Industry, 12 Whitehall, London, S.W.1, England. 7¼x9¾ in. 130 pp. Price to Members: 4/6 (approximately $1.25); Non-Members: 12/6 (approximately $3.25).

(Available from Book Dept., RUBBER AGE, at $3.50 each)

This latest annual report on the progress of world-wide rubber technology is again ably edited by Mr. Drakeley and again covers all phases of the rubber industry, with leading experts and technologists contributing specific chapters discussing developments which occurred during the year of 1943. Beginning with a historical and statistical review, subjects covered include planting and production of rubber and latex; properties, applications and uses of latex; chemistry and physics of raw rubber and rubber derivatives; synthetic rubber; testing equipment; compounding ingredients; fibres and textiles; chemical and physical properties of vulcanized rubber; tires; belting; hose and tubing; cables and electrical insulation; footwear; mechanical goods; flooring; surgical goods; textile-rubber composites; sponge rubber; hard rubber; works processes and materials; and machinery and appliances. As usual, excellent name and subject indexes, the latter carefully cross-referenced, are included.

•

Commercial Waxes: Natural and Synthetic. Edited by H. Bennett. Published by the Chemical Publishing Co., Inc., 26 Court St., Brooklyn, N. Y. 5½x8½ in. 583 pp. $11.00.

This book is both a symposium and compilation of data on natural and synthetic commercial waxes, including properties, uses, methods of handling and formulas for making commercial wax compositions. All classes of waxes, such as mineral, animal, vegetable, insect, synthetic and compounded waxes, are discussed in detail, with data given on melting point, form and fracture, purity, hardness, flexibility, moldability, adhesiveness, solubility, and other properties. Sources and uses of each type of wax are outlined. One section is devoted to the handling and compounding of the various waxes. The use of wax in rubber compositions is briefly discussed and a few formulas of rubber wax compositions are included. The book also includes a glossary of terms and a subject index.

•

Varnish Constituents. By H. W. Chatfield. Published by Interscience Publishers, Inc., 215 Fourth Ave., New York 3, N. Y. 5½x8½ in. 496 pp. $7.00. (Note: This is a photo-offset reproduction of the English edition, published by Leonard Hill, Ltd., London, England).

One of the most complete works of its kind, this book presents a wealth of material on the properties and behavior of varnish constituents of natural and synthetic origin. It reviews the more important developments of recent years and blends these into a composite whole. Numerous tables condense information on sources, manufacture, physical constants, properties, trade names, chemical constitution, recommended uses, and testing of products of all countries. Literature references are numerous. Separate chapters are devoted to rubber and chlorinated rubber. Author and subject indexes are included.

•

A comprehensive study on what management can really do to reduce *absenteeism* was recently issued by the George S. May Business Foundation, 111 So. Dearborn St., Chicago, Ill. Both sides of the absenteeism problem—management and labor—are covered.

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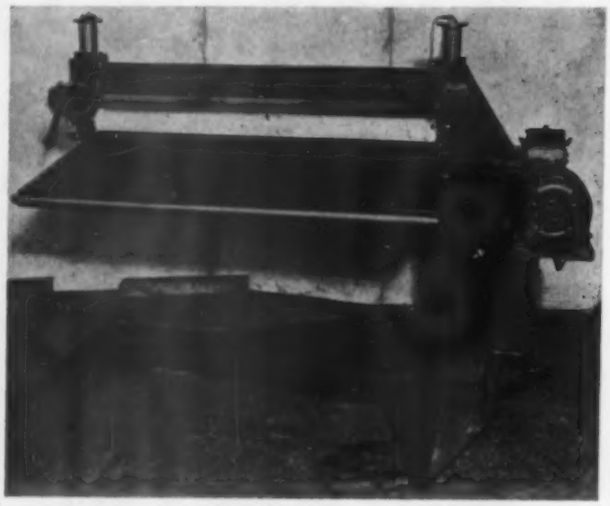

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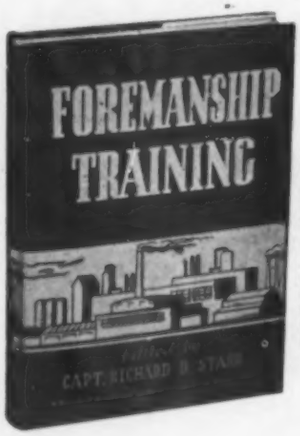

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The recently developed "Conference" Method of training is now available in this new book WRITTEN BY 12 LEADING INDUSTRIAL TRAINING DIRECTORS, under the supervision of Capt. R. B. Starr, formerly Asst. Director of Training, International Harvester Company. This book, packed with tested, practical ideas, gives a complete 22-hour course which can be given in 6 weeks in your plant.

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THE RUBBER AGE

250 West 57th Street New York 19, N. Y.

Directory of the Society of the Plastics Industry: 1944-45. Published by the Society, 295 Madison Ave., New York 17, N. Y. 6x9 in. 247 pp. $2.50.

This is the second directory issued by the Society of the Plastics Industry. Like the first, it discusses the activities of the Society, and lists company members in the United States and Canada, as well as those outside of these two countries, and professional members in the United States and Canada. Product, material and machinery indexes, and a company member index, are also included. The Product Index has been expanded to include hundreds of additional plastics items, while the Who's Who Section, one of the features of the directory, has naturally grown with the increase in membership of the Society, now consisting of approximately 440 companies. The directory is truly representative of the plastics industry.

•

The South American Handbook: 1944. Published by Trade and Travel Publications, Ltd., London, E. C. 3, England. Available in the United States from the H. W. Wilson Co., 950 University Ave., New York 52, N. Y., and Thos. Cook & Son, Inc., 587 Fifth Ave., New York 17, N. Y. 4½x6¾ in. 798 pp. $1.25.

The latest edition of this year book and guide to the countries and resources of South and Central America, Mexico and Cuba, the twenty-first annual number to be published, has been completely revised and brought up-to-date. As usual, information of definite value to both the commercial traveler and the tourist is given in chapters covering each Latin American country. Exporters, too, will find this information of value in connection with their daily work.

BOOKLETS, CATALOGS, Etc.

Modern Precision. (General Catalog Issue). Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44, Penna. 10½ x 15½ in. 28 pp.

In the pages of this special issue of its regular house organ, Leeds & Northrup has assembled for the first time under one cover briefed descriptions of all of its products—measuring instruments, automatic controls and heat-treating furnaces. The "catalog" provides a comprehensive index and mentions in connection with each instrument appropriate literature in which it is fully described, either as a piece of apparatus, in a group suitable for a certain measurement, or in its application to a specific process.

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(FOR FURTHER DETAILS SEE AD ON PAGE 346)

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Further, our treatment will make it possible to use your liners for a considerably longer time, thus actually reducing purchases of new cotton piece goods. Over a period of time Capitol Liner Treatment will, literally, "pay for itself."

Because of the stringent shortage of every kind of cotton piece goods, serious consideration of our Liner Treatment may effectively relieve one of your current problems. We shall be glad to answer your inquiries.

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REVIEWS (CONT'D)

Effect of Milling on Properties of Hevea and Buna Rubbers—Effect of Moisture on Curing Rate of GR-S. By W. B. Wiegand and H. A. Braendle. Columbian Carbon Co., 41 East 42nd St., New York, N. Y. 5½ x 7¾ in.

Issued as Volume V, Number 3 of the "Columbian Colloidal Carbons" series, this booklet presents two studies undertaken by Columbian Carbon on the effect of heat and moisture on GR-S. Both reports were originally presented before the Spring Meeting of the Rubber Division, A.C.S., in New York in 1944, and the first one listed was published in the August, 1944, issue of *Industrial & Engineering Chemistry*. The conclusions are drawn that the irreversibility of the thermal effects on GR-S makes the avoidance of excessive mixing, milling and processing temperatures imperative, while the inclusion of water as a compounding ingredient for the stabilization of the curing rate of GR-S seems justified.

•

Neoprene Sponge. (Report No. 44-1). By L. S. Bake. Rubber Chemicals Division, E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Delaware. 6¼x9½ in. 32 pp.

Since the first neoprene sponge was manufactured, development work has continued and much fundamental information relative to the compounding of suitable compositions has been obtained by DuPont and others. This report presents this information to enable manufacturers to prepare neoprene sponge having various pre-selected properties with a minimum of effort. It discusses the advantages and disadvantages of neoprene sponge compositions, plasticization of Neoprene Type GN (GR-M), compounding ingredients, compounding and processing principles, stability of uncured Neoprene Type GN (GR-M) sponge compositions, blowing of sponge, sponge density, shrinkage, specific properties, and Neoprene Type FR sponge. Both a contents page and a subject index are included for convenience.

•

Hercules Products. Hercules Powder Co., Inc., Wilmington, Delaware. 8½x11 in. 36 pp.

This booklet lists Hercules chemicals and industrial explosives and approximately 50 industries which these products serve. Designed for easy reference, the products are first indexed according to various industries, including the rubber industry, in which the chemicals and explosives are used, and then according to chemical families. Chemicals in the cellulose family, rosins and modifications, rosin esters and synthetic esters, terpene solvents and chemicals, explosives, and special products are discussed.

FOR LOW HEAT BUILD-UP
USE PHILBLACK A

(FOR FURTHER DETAILS SEE AD ON PAGE 346)

Materials

PROCESSING EQUIPMENT

Sifters, Crushers, Cutters, Dry and Liquid Mixers, Mills, Grinders, Pulverizers, Conveyor Systems, Complete Installations.

The handling equipment construction "know-how" of the Mercer Engineering Works, Inc., Clifton, N. J. . . . The more than 40 years processing equipment experience of Robinson Mfg. Co., Muncy, Pa. . . . All are embodied in and represented by

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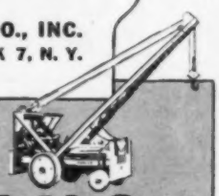

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Coal-tar softener, formerly widely used in natural rubber, now found to be an effective plasticizer and wetting agent for GR-S to improve resistance to abrasion, tensile strength, elongation and resilience.

COUMARONE RESINS

A number of Rubber Reserve Company's releases on compounding synthetic rubbers contain suggested recipes calling for coumarone resins. They are available in various melting points and colors.

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Effective softener for several of the synthetic rubbers, such as Hycar OR, Perbunan, etc., imparting high tensile, low modulus and low set.

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Several types manufactured for both digestor and pan processes.

COAL-TAR SOLVENTS

Benzol, Tollac* Solvent, Nevsol*, Xylol, 2-50-W* Hi Flash Solvent, Cosol*, and special solvents; for rubber cements and various rubber solutions.

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- **LIGHT**—The highest type. For the most exacting compounds. Fine particle size. Low moisture and carbonate content.
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- **HEAVY**—Meets low cost need where high type compounding is not essential.

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MARKETS

Rubber – Crude, Reclaimed and Scrap – Cotton – Ducks – Tire Fabrics – Sheetings

NEW YORK, JAN. 15, 1945

Crude Rubber

IT seems quite evident from recent reports attributed to officials of the State Department, that the United States will not enter into any definite commitments on the overall rubber situation on any international basis for some time to come. These officials hold, and rightly so, that the situation is still in too great a state of flux, and the potentialities of the gigantic synthetic rubber industry are still an unknown factor for the post-war period. Meetings will continue to be held between representatives of the American, British and Dutch governments, but these meetings will be confined to discussions of supply and demand rather than to control factors. One such meeting was scheduled to be held in Washington this month.

According to a report issued by Jesse Jones, head of the Reconstruction Finance Corporation, just as this issue went to press, natural rubber importations into the United States, including those of the regular rubber trade, since early 1940 to the present have been more than 2,280,000 long tons. In this period the Rubber Reserve Co. imported 930,000 long tons, which includes 83,000 tons purchased from the Commodity Credit Corporation. Of the total amount, 116,000 tons were received in 1944.

Of considerable interest in recent weeks was the recommendation made by the Congressional committee which has been investigating the guayule situation that government withdraw from the cultivation of guayule but continue experimental and development work. The committee also urged that a price floor be placed on guayule for a number of years so that private interests, particularly small growers, would be encouraged to cultivate the rubber-bearing plant. A 28-cent floor was suggested.

Prices shown below are ceilings set by the Rubber Reserve Company:

	C	N-C
Plantations—		
Ribbed Smoked Sheets, 1X	22½	40
Thick Pale Latex Crepe, 1X	22½	40
Thin Pale Latex Crepe, 1X	22½	40
Thick Brown Crepe, 1X	21¾	38¼
Thin Brown Crepe, 1X	21¾	38¼
Thick Remilled Blankets, #1	21¾	38¼
Rolled Brown or Flat Bark	18	35½
Smoked Blankets, #1	21½	38½
Claro Brand 1XRSS	22½	40
Sole Crepe Trimmings	22	39½
Sole Crepe	22½	40
Wild—		
Uncut Fines, Crude	15	29
Cut Fines, Crude	15½	29¾
Cut Fines, Washed & Dried	22½	40
Upriver Coarse, Crude	12¾	26½
Upriver Coarse, Washed & Dried	20¼	37¼
Caucho Ball, Crude	11¾	24¾
Caucho Ball, Washed & Dried	19½	37
Guayute—		
Carload Lots	17½	31
Less than Carload Lots	18	31½
Balata—		
Surinam Sheet	42½	42½
Manaos Block	38¾	38¾
Colombian Block	38¾	38¾
Peruvian Prime	38¾	38¾
Chicken Wire	23¼	23¼
Latex—		
Normal, Tank Car Lots	26	43½
Creamed, Tank Car Lots	26¾	44¼
Centrifuged, Tank Car Lots	27¾	45¼
Heat-Concentrated, Carload Drums	29½	47

C. for Civilian Use; N-C. for Non-Civilian Use.

Scrap Rubber

Somewhat lessened demand for scrap from reclaimers in recent weeks is reported by dealers. This is attributed to the usual slack which occurs at inventory time around the turn of the year, plus the fact that despite the many difficulties of wartime supply several large reclaimers have managed to amass excellent stockpiles. These stockpiles consist principally of tire and tube scrap and represent one of the basic reasons why there is practically no demand of any kind for the miscellaneous scrap held by the Rubber Reserve Co. Few offerings of tires or tubes are refused, and both bring good prices. Methods of segregating synthetic scrap are still being worked out, but no definite achievement along such lines is reported. Scrap rubber stocks are still ample. Prices shown below are ceilings on typical grades of scrap:

(Prices to Consumers, Delivered Akron)

Mixed passenger tires	ton	$20.00
Beadless truck tires	ton	26.00
Mixed truck tires	ton	20.00
Beadless passenger tires	ton	26.00
No. 1 passenger peelings	ton	52.25
No. 1 truck peelings	ton	52.25
No. 2 passenger tubes	lb.	.07¾
Red passenger tubes	lb.	.07½
Black passenger tubes	lb.	.06¾
Mixed passenger tubes	lb.	.06½
No. 2 truck tubes	lb.	.07½
Red truck tubes	lb.	.07¾
Black truck tubes	lb.	.06½
Buffings	ton	35.00
Bicycle tires	ton	15.00
Air bags and water bags	ton	15.00
Boots and shoes	ton	33.00

Tire Fabrics

The situation in the tire fabric field remains unchanged, with practically no demand for such fabrics. Consequently, prices are nominal and in many quarters are not even being quoted. The prices shown below are those which were in force on or about January 15, 1942.

(Prices Net at the Mill)

Peeler, carded, 23/5/3	lb.	.43½ @	.44
Peeler, carded, 23/4/3	lb.	.44½ @	.45
Peeler, carded, 15/3/3	lb.	.41½ @	.42
Peeler, carded, 15/4/2	lb.	.41½ @	.42
Peeler, carded, 13/3/3	lb.	.40½ @	.41
CHAFERS			
Carded, American, 1 1/16"	lb.	.43½ @	.44
Carded, American, 1"	lb.	.39½ @	.48

Sheetings

48x40	36 in.	5.50	lb.	—	@ 8.272
40x40	36 in.	6.15	lb.	—	@ 7.398
40x36	36 in.	6.50	lb.	—	@ 7.000
48x48	40 in.	2.50	lb.	—	@17.200
48x48	40 in.	2.85	lb.	—	@15.087
56x60	40 in.	3.60	lb.	—	@12.638
48x44	40 in.	3.75	lb.	—	@11.733

Note: Prices shown above are ceiling prices set by order of the O.P.A. Quotations are based on an average price of 15-16-inch middling cotton at the ten designated southern markets.

Cotton

The price of middling uplands on the Cotton Exchange has swung in the narrow range of 39 points since our last report, high being 22.59 on January 10 and low 22.20 on December 14. The average price for middling uplands on the Exchange for the month of December was 22.27, based on 24 trading days. Prices hovered around the 22.30 mark in mid-December, rising and dropping a few points from day to day, the fall-offs being due to waves of hedge selling and scattered liquidation, largely occasioned by the possibility that cotton will return to a competitive price basis next season should the government abandon present crop control programs. For the most part, deferred months suffered particularly from the selling waves. Despite favorable war news, generally a depressing influence on the market, prices began a steady upward march toward the turn of the year, and although halted temporarily from time to time by commission house sales, the rising trend is still evident. The Census Bureau reported on January 15 that cotton consumed in December totaled 760,740 bales of line and 120,498 bales of linters, compared with 836,541 and 122,304 bales, respectively, in November. Quotations for middling uplands on the Exchange follow:

	Dec. 12	January 15		
	Close	High	Low	Close
March	21.93	22.21	22.05	22.12
July	21.53	21.80	21.64	21.69
October	....	21.19	21.01	21.06

Reclaimed Rubber

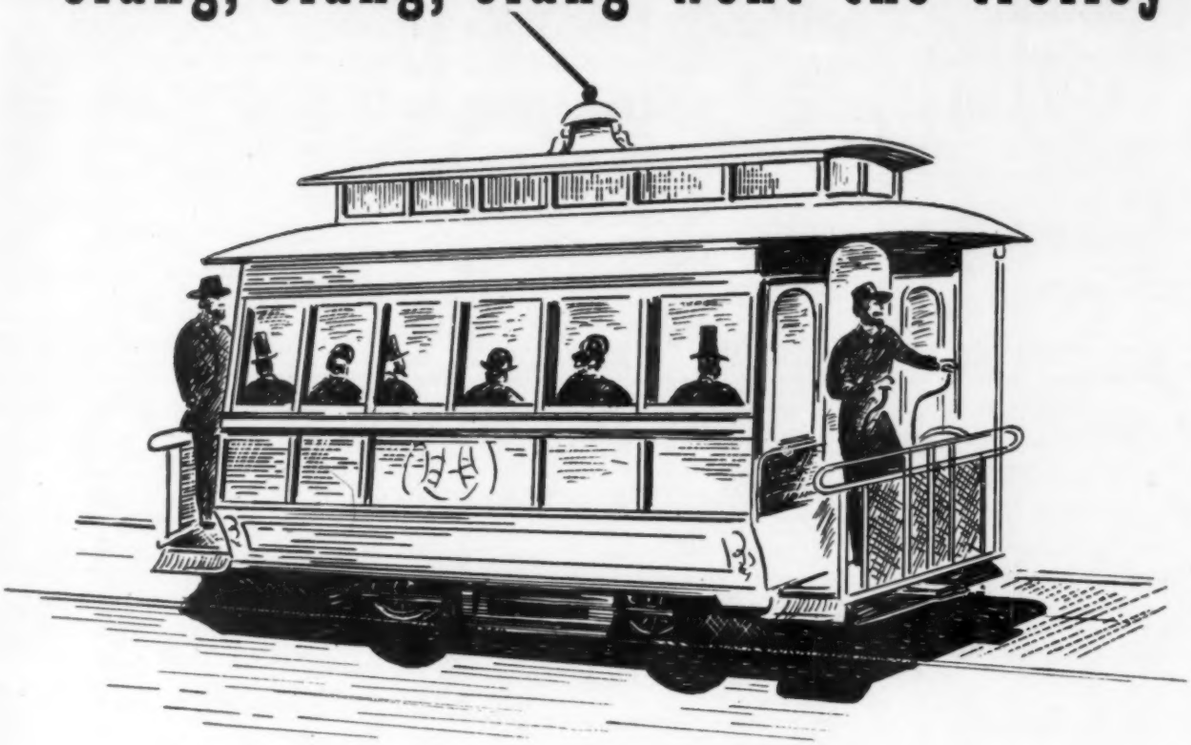
A sharp increase in demand for reclaimed rubber has been experienced in recent weeks, stemming from practically all branches of the industry. The tight carbon black situation, reported in detail elsewhere in this issue, is partially responsible for this increased demand, especially from manufacturers of camelback, but larger quantities are also being requested by manufacturers of heels and soles as some of the war-expanded plants come into production. Several large export orders are also reported. An increase of ¼ cent per pound in ceiling prices has been granted reclaimers by OPA. This is the second increase in recent months, and it was granted to compensate for higher manufacturing costs. Prices shown below are ceilings on typical grades of reclaim:

Shoe			
Unwashed	lb.	.07½ @	.07¾
Tube			
Black Tube	lb.	.11¾ @	.12
Red Tube	lb.	.12½ @	.12¾
Tires			
Black (acid process)	lb.	.08 @	.08¼
Black, selected tires	lb.	.07 @	.07¼
Truck, Heavy Gravity	lb.	.09 @	.09¼
Miscellaneous			
Mechanical blends	lb.	.05 @	.06
White	lb.	.13½ @	.13¾

Ducks

Enameling (single filling)	lb.	— @	.44¼
Belting and Hose	lb.	— @	.39
Single filling, A grade	lb.	— @	.19¼
Double filling, A grade	lb.	— @	.20¼

clang, clang, clang went the trolley



Buffalo Reclaim — in numerous grades — was a firmly established product... widely used in the manufacture of Carriage Cloth, Rubber outerclothing and footwear when the electric trolley car began to replace the old Belt Line horse car.

In 1883 **U.S. Rubber Reclaiming** began serving American industry solely *as reclaimers* . . . and this is its policy today. First to establish and install, in 1905, a chemical laboratory exclusively devoted to the processing and control of Reclaimed Rubber . . . the *resultant* uniform high quality of Buffalo Reclaims has set the pace for the industry.

The war years have created many new problems for the vital Reclaim Industry — how to handle synthetics for example . . . hundreds of finished products which never before utilized reclaim are using it with amazing success . . . and Buffalo met each challenge, even bettered its products.

Unlimited new uses for reclaim are certain when American industry again turns to peace-time pursuits. Manufacturers who plan products containing rubber are invited to consult Buffalo's *very practical* research department.

U. S. Rubber Reclaiming Co., Inc.

500 Fifth Avenue **New York 18, N. Y.**

PLANT AT BUFFALO, N. Y.

AKRON	TRENTON	TORONTO
DUGAN & CAMPBELL	H. M. ROYAL, INC.	H. VAN DER LINDE, LTD.
907 Akron Savings & Loan Bldg.	689 Pennington Ave.	156 Yonge St.

CHEMICAL MARKETS

New York, Jan. 15, 1945
All Prices F.O.B. Works

ACCELERATORS

Organic			
A-1 (Thiocarbanilid)	lb.	.28	.33
A-10	lb.	.36	.42
A-19	lb.	.52	.58
A-32	lb.	.60	.70
A-77	lb.	.42	.55
A-100	lb.	.42	.55
Aldehyde ammonia, crystals	lb.	.65	.70
Altax	lb.	.39	.41
Beutene	lb.	.59	.64
B-J-F	lb.	.34	.39
Butasan	lb.	—	1.10
Butyl Zimate	lb.	—	1.10
Captax	lb.	.34	.36
Crylene	lb.	.40	.47
Di-Ortho-Tolyguanidine	lb.	.44	.46
Diphenylguanidine	lb.	.35	.41
El-Sixty	lb.	.36	.43
Ethasan	lb.	—	1.10
Ethyl Tuads	lb.	—	1.25
Ethyl Zimate	lb.	—	1.10
Ethylidine aniline	lb.	.42	.43
Formaldehyde aniline	lb.	.31	—
Guantal	lb.	.39	.48
Hepteen	lb.	.34	.39
Hexamethylenetetramine	lb.	.33	—
Lead Oleate, No. 999	lb.	.13	—
Witco	lb.	.15	—
Ledate	lb.	—	1.20
Methasan	lb.	—	1.20
Methyl Tuads	lb.	—	1.25
Methyl Zimate	lb.	—	1.20
Monex	lb.	—	1.25
Pentex	lb.	.74	.84
Phenex	lb.	.49	.54
Pip-Pip	lb.	—	1.63
R & H 50-D	lb.	.42	.43
R-2 Crystals	lb.	—	1.55
Rotax	lb.	.44	.46
Safex	lb.	1.15	1.25
Santocure	lb.	.60	.67
Selenac	lb.	—	1.60
SPDX-G	lb.	.53	.58
Super-Sulfur No. 2	lb.	.13	.15
Thiocarbanilid, drums	lb.	.28	.33
Thiofide	lb.	.39	.46
Thiotax	lb.	.34	.41
Thiurad	lb.	—	1.25
Trimene	lb.	.54	.64
base	lb.	1.03	1.18
Triphenylguanidine	lb.	.45	—
Ulto	lb.	.99	1.04
Ureka	lb.	.50	.57
Blend B	lb.	.50	.57
Blend C	lb.	.48	.55
Vulcanex	lb.	.42	.43
Vulcanol	lb.	.85	—
Inorganic			
Litharge, domestic	lb.	.07	.07½
Magnesia, calcined, heavy	lb.	.04	—

COLORS

Blues [b]			
Prussian	lb.	.36	—
Ultramarine	lb.	.17	.27
Browns [b]			
Mapico	lb.	.1135	—
Umber, Turkey	lb.	.04¼	—
Greens [b]			
Chrome	lb.	—	.25
Guignet's Green	lb.	.70	—
Reds			
Antimony crimson, 15/17	lb.	—	—
Indian	lb.	.08¼	—
Domestic (Maroon)	lb.	.11	—
Mapico	lb.	.096	—
Red oxide, pure	lb.	.10	.12
Rub-Er-Red	lb.	.09¼	—
Whites [b]			
Cryptone No. 19	lb.	.0560	.0585
Cryptone CB No. 21	lb.	.0560	.0585
Cryptone ZS-800	lb.	.0825	.0850
Lithopone:			
Albalith	lb.	.04½	.04½
Astrolith	lb.	.04½	.04½
Azolith	lb.	.04¼	.04½
Ray-cal	lb.	.05½	.05¾
Rayox	lb.	.14½	.15¾
Titanox A	lb.	.14½	.14¾
Titanox B	lb.	.05¾	.06
Titanox C	lb.	.05½	.05¾
Zinc Oxide—American Process [b]			
American Azo:			
ZZZ (lead free)	lb.	.07¼	.07½
Anaconda, lead free	lb.	.07¼	.07½
Horsehead Lead Free Brand:			
Special—3	lb.	.07¼	.07½
XX Red—4	lb.	.07¼	.07½
XX Red—72	lb.	.07¼	.07½
XX Red—103	lb.	.07¼	.07½
Kadox, black label—15	lb.	.07½	.07½
Red label—17	lb.	.07½	.07½
St. Joe, black label	lb.	.07½	.07½
green label	lb.	.07½	.07½
red label	lb.	.07¼	.07½
U. S. P.—7, bbls.	lb.	.10½	.10¼
Zinc Oxide—French Process: [b]			
Florence White Seal—7 bbl.	lb.	.09½	.09¼
Green seal—8	lb.	.09	.09¼
Red seal—9	lb.	.08½	.08¼
Yellows [b]			
Cadmolith	lb.	.55	.60
Chrome	lb.	—	.50
Mapico	lb.	.071	—

BLACKS
(In bags, carload lots)

Arrow Compact		.0355	—
Atlantic		.0355	—
Certified		.0355	—
Certified Spheron		.0355	—
Continental		.0355	—
Disperso		.0355	—
Dixiedensed		.0355	—
Dixiedensed 66		.0355	—
Excello		.0355	—
Furnex		.03½	.06
Furnex Beads		.03½	.06
Gastex		.03½	.06
Kosmobile		.0355	—
Kosmobile 66		.0355	—
Kosmos-Dixie 20	lb.	.03½	.06
Micronex (Amarillo)		.0355	—
Micronex Beads (Amarillo)		.0355	—
Pelletex		.03½	.06
P-33		.04	.06½
Philblack A	lb.	.05	—
Shell Carbon (Del. Midwest)		.0240	—
Sterling		.035	—
Supreme		.0355	—
Thermax		.0225	.05
Wyex		.0355	—

COMPOUNDING MATERIALS

Aluminum Flake	ton	18.00	24.50
99½%-300	ton	—	16.50
86-90%-300	ton	—	13.50
Asbestine	ton	16.50	20.00
Atomite	ton	—	27.50
Barium carbonate (98-100%)	ton	47.00	49.00
Barytes	ton	25.35	36.00
Bentonite	ton	11.00	16.00
Blanc fixe, dry	ton	60.00	67.50
Calcene	ton	37.50	43.00
Catalpo (fact)	lb.	.02	—
Clay, Aerfloted, Suprex	ton	11.00	23.50
Aerfloted Paragon	ton	10.00	22.50
Champion	ton	—	11.00
Crown	ton	—	11.00
Dixie	ton	11.00	23.50
Kaolloid	ton	—	9.00
Langford	ton	—	8.50
Magnolia	ton	—	10.00
McNamee	ton	10.00	22.50
Par	ton	—	11.00
Witco	ton	10.00	—
Kalite No. 1	ton	26.00	52.00
Kalvan	ton	100.00	126.00
Keystone white	ton	—	14.00
Magnesium carbonate	lb.	.06¼	—
Mineralite	ton	—	30.00
Pyrax A	ton	—	7.90
Rottenstone (powd. Dom.)	ton	25.50	37.50
Rubberol	lb.	—	.17½
Silene EF (calcium silicate)	lb.	.055	.06
Silical	ton	65.00	85.00
Snowflake white	ton	—	16.00
Talc, domestic	ton	17.00	25.00
Whiting, commercial	ton	16.00	26.00
Witco	ton	6.00	—
Witcal	ton	—	100.00
Witcarb R-12	ton	—	40.00
Wood Flour (100 mesh)	ton	30.00	32.00

MINERAL RUBBER

285°-300° Mineral Rubber	ton	25.00	27.00
Black Diamond	ton	25.00	—
Dielex	lb.	—	.06
Hard Hydrocarbon	ton	25.00	27.00
MilliMar	lb.	—	.05½

MISCELLANEOUS

Aromatics—Rodo $0	lb.	4.00	4.50
Rodo $10	lb.	5.00	5.50
Curodex 19	lb.	2.75	—
Curodex 188	lb.	3.50	—
Curodex 198	lb.	4.50	—
Para-Dors	lb.	4.50	—
Areaklene No. 375	lb.	.35	.50
Darvan (dispersing agent)	lb.	.30	.39
Santomerse S	lb.	.11	.25
Sponge Paste	lb.	—	.18
Sunproof	lb.	.22¼	.27¼
Tonox	lb.	.50	.59
Ty-Ply	gal.	6.75	8.75
Unicel (blowing agent)	lb.	.50	—

SOFTENERS

Acids			
Acetic, 28%, bbls.	100 lb.	3.38	3.63
Nitric, 36 degrees	cwt.	5.00	—
Acids, Fatty			
Laurex	lb.	.14¼	.17¼
SL-20	lb.	.11	.13
Stearex Beads	lb.	.10	.11
Stearite	lb.	.10	—
Alkalies			
Caustic Soda, 76%	cwt.	2.70	5.70
Soda Ash, 58%	cwt.	1.15	2.90
Oils			
Degras, bbls.	lb.	.10	.12
Para-Flux	gal.	.17	.18
Para-Lube	lb.	.046	.048
Petrolatum, amber [b]	lb.	.03¾	—
Pigmentaroil, tank cars	gal.	.20½	—
in drums	gal.	.26½	.27½
Pine, tanks	gal.	.55	—
Rosin Oil, cmpd.	gal.	.40	—
Rubberol	lb.	.13½	.14
Rubtack	lb.	.10	—
Seedine, c.l.	lb.	.07¼	—
Witco Palm Oil	lb.	—	—
Witco Softener No. 20	gal.	.20	—
Woburn No. 8, c.l.	lb.	.06	—
Resins and Pitches			
Pitch, Burgundy	lb.	.06	—
coal tar	ton	19.00	22.00
hardwood	ton	16.00	22.50
pine, 200 lb. gr. wt.	bbl.	—	4.50
Pigmentar, tank cars	gal.	.20½	—
in drums	gal.	.26½	.27½
Retort Pine Tar, drums	gal.	.26½	.27½
Solvents			
Acetone, pure [a]	lb.	.07	—
Benzene, 90%, tank car	gal.	.14	—
Beta-Trichlorethane	gal.	—	.20
Bondogen	lb.	.98	1.25
Carbon, bisulfide	lb.	.05	.08½
Carbon tetrachloride	gal.	.83	1.27
Dichlorethylene	lb.	—	—
Dipentene, cml., drums	gal.	.48	.50
Ethylene dichloride	lb.	.07½	.08¼
Plastogen	lb.	.07¾	.12
Reogen (drums)	lb.	.11½	.15
Rub-Sol	gal.	.09½	—
Trichlorethylene	lb.	.08	.09¼
Turpentine, spirits	lb.	.78½	—
dest. dist., drums	gal.	.50	.55
Waxes			
Antisol	lb.	.22½	.23½
Beeswax, white [b]	lb.	.58	—
Carnauba, yellow [b]	lb.	.83¼	—
Ceresin, white, dom.	lb.	.13½	.15
Montan, crude	lb.	—	—
Paraffin [a]			
Yellow crude scale, 124/126	lb.	.04¼	—
Refined, 123/125	lb.	.05¼	—

ANTI-OXIDANTS

Agerite Alba	lb.	1.95	2.05
Gel	lb.	.52	.54
Hipar	lb.	.61	.63
Powder	lb.	.40	.42
Resin	lb.	.43	.45
Resin D	lb.	.40	.42
White	lb.	1.23	1.33
Albasan	lb.	.69	.74
Antox	lb.	.54	.56
B-L-E	lb.	.40	.49
Flectol H	lb.	.40	.47
Neozone A, C, D, E	lb.	.40	.63
Oxynone	lb.	.77	.90
Retardex	lb.	.44½	.47½
Santoflex B	lb.	.40	.47
Santoflex BX	lb.	.54	.61
Santovar O	lb.	1.15	1.40
S.C.R.	lb.	.32	.34
Stabilite	lb.	.48	.50
Stabilite Alba	lb.	.69	.74
VGB	lb.	.43	.52

EXTENDERS

Naftolen R-100	lb.	.10	.12

LUBRICANTS—MOLD & RUBBER SURFACE

Areaklene	lb.	.35	.50
Cocoa Soapstock	lb.	.06	.08
Colite	gal.	.90	1.15
Dipex	lb.	.06	.08
Glycerized Liquid Lubricant	gal.	—	1.35
Lubrex	lb.	.25	.30
Mineralite	ton	—	30.00
Sericite	ton	65.00	75.00
Soap Tree Bark, cut, sifted	lb.	.06	.08

FACTICE OR RUBBER SUBSTITUTES

Amberex	lb.	.25	—
Amberex Type B	lb.	.18¾	—
Black	lb.	.08½	.13
White	lb.	.09	.15
Brown	lb.	.10	.14
Neophax A	lb.	.16½	—

VULCANIZING INGREDIENTS

Dispersed Sulfur No. 3	lb.	.08	.12
Sulfur Chloride, yellow (drs.)	lb.	.03	.08
Sulfur, rubber makers			
Refined (bags)	cwt.	2.55	—
Commercial (bags)	cwt.	2.20	—
Telloy	lb.	1.75	—
Vandex	lb.	1.75	—
Vultac No. 1	lb.	.38	.43
Vultac No. 2	lb.	.38	.43
Vultac No. 3	lb.	.42	.49

[a] Price Ceilings.
[b] Price Suggestions or Agreements.

The WHERE-TO-BUY Section of THE RUBBER AGE in which are listed the Products and Services of the Leading Suppliers to the Industry.

The Market Place

If what you are seeking is not listed here, write to the Service Department of THE RUBBER AGE, 250 West 57th St., New York 19, N. Y.

Chemicals and Compounding Materials —

ACCELERATORS—
El-Sixty; Ureka; Ureka C; Guantal; Santocure; DPG; Pip Pip; A-10; A-32; A-100; R-2 Crystals • ANTIOXIDANTS—Flectol H; Santoflex B, BX; Santovar O.
MONSANTO CHEMICAL CO.
Rubber Service Dept.
1012 Second National Bldg., Akron 8, Ohio

CARBON BLACK
"Atlantic" Carbon Blacks meet the exacting standards of modern rubber production.
Chas. Eneu Johnson & Co., Mfrs.
Distributed by
C. P. HALL CO.
Akron — Boston — Los Angeles — Chicago

CHEMICALS
For Natural & Synthetic Rubber
"PICCO" Brand—Plasticizers; Coumarone Resins; Reclaiming Oils, Coal Tar Naphthas.
Pennsylvania Industrial Chem. Corp.
Clairton Penna.

AERO BRAND
RUBBER CHEMICALS
DPG—DOTG—Accelerator 49
Rubber Sulphur
American Cyanamid & Chemical Corporation
30 Rockefeller Plaza, New York 20, N. Y.

CARBON BLACK
DIXIE...KOSMOS
Used throughout the world
UNITED CARBON COMPANY
Charleston, W. Va.
New York • Akron • Chicago

CHEMICALS
A complete line of plasticizers, resins, substitutes, fillers, etc., for Synthetic, Natural and Reclaimed Rubber.
STANDARD CHEMICAL COMPANY
Akron 8, Ohio

ALUMINUM FLAKE
A uniform, fine, low gravity, white reinforcing pigment. *Furnished to the rubber trade for 42 years.*
The Aluminum Flake Co.
Akron, Ohio

CARBON BLACK
CONTINEX SRF—A New Semi-Reinforcing Furnace Black. *Now in Full Scale Production.*
Continental Carbon Co., *Mnfr.*
Witco Chemical Co., *Distributor*
295 Madison Avenue
New York 17, N. Y.

CHEMICALS AND MINERAL
Ingredients—Whiting, Clay, Talc, Barytes, Colors. Heavy Calcined Magnesia. Carbonate of Magnesia, Pumice Stone.
Standard Since 1890
Whittaker, Clark & Daniels, Inc.
260 West Broadway New York 13, N. Y.

ANTIMONY Pentasulphide, golden and crimson, very fine, pure.
Rare Metal Products Co.
Belleville, N. J.
Direct Factory Representation

CATALPO—The universal and standard rubber pigment now being used in treads, solids, tubes, carcass frictions, etc.
Moore & Munger
33 Rector Street New York 6, N. Y.

CHEMICALS
PIGMENTS
ASPHALTUMS
Witco Chemical Company
295 Madison Avenue
New York 17, N. Y.

CALCENE—SILENE EF
Two exclusive Columbia pigments proving exceptionally valuable to Rubber Compounders. Send for free data sheets.
PITTSBURGH PLATE GLASS CO.
COLUMBIA CHEMICAL DIV.
Grant Bldg., Pittsburgh (19), Pa.

CHEMICALS
Carbon Black—Clay—Colors
Accelerators—Sulphur
Stocks Carried At All Times
Ernest Jacoby & Co.
79 Milk St. Boston, Mass.
Cable Address: Jacobite Boston

CLAY
*CHAMPION
*MAGNOLIA
National Kaolin Company
Distributed by
C. P. HALL CO.
Akron — Los Angeles — Chicago

CARBON BLACK-MICRONEX
The world's standard gas black; universally known as the "King of Rubber Pigments."
BINNEY & SMITH CO.
41 East 42nd St. New York 17, N.Y.

CHEMICALS
From Coal Tar Bases—For Use As Antiseptics, Plasticizers, Reclaiming Oils, Softeners, Solvents, Tacifiers.
Koppers Company
Tar and Chemical Div.
Koppers Bldg. Pittsburgh, Pa.

COAL TAR CHEMICALS
Coumarone Resins — Tack Producers
Resinous Oils — Dispersing Oils
Reclaiming Oils — Softeners
Solvents
The Neville Company
Neville Island, Pittsburgh, Penna.

CARBON BLACK—Aerfloted
WYEX — TX — HX
Compressed — Compact (Dustless)
J. M. Huber, Inc.
460 West 34th St., New York 1, N. Y.

CHEMICALS

For Rubber		For Industry Generally
Accelerators	*Acids*	*Latex*
Antioxidants	*Oil of Myrbane*	*Lotol*
Specialties	*Aniline Oil*	*Dispersions*

NAUGATUCK CHEMICAL
Division of United States Rubber Co.
1230 SIXTH AVE. NEW YORK 20, N. Y.

COLLOIDAL SULPHUR
COLLOIDAL ZINC OXIDE
COLLOIDAL COLORS
HEVEATEX CORPORATION
78 Goodyear Ave. Melrose, Mass.
Offices in New York, Akron, Chicago

The Market Place

The WHERE-TO-BUY Section of THE RUBBER AGE in which are listed the Products and Services of the Leading Suppliers to the Rubber Industry. If what you are seeking is not listed here, write to the Service Department of THE RUBBER AGE, 250 West 57th St., New York 19, N. Y.

Chemicals and Compounding Materials {continued}

COLORS
BRILLIANT ORGANIC DYES; PERMANENT, NON-BLEEDING, LOW COST
For All Cures
MONSANTO CHEMICAL CO.
Rubber Service Dept.
1012 Second National Bldg., Akron, Ohio

COMPOUNDING Materials
Vulcanizing Agents — Pigments
Accelerators — Clays
Antioxidants — Mineral Rubber
Plasticizers — Aromatics
Dispersions — Blacks
R. T. VANDERBILT CO.
230 Park Ave. New York 17, N. Y.

CUMAR —Paracoumarone Resin.
A neutral gum for synthetic rubber compounding. *Laboratory test data, samples and prices on request.*
THE BARRETT DIVISION
Allied Chemical & Dye Corp.
40 Rector St., New York 6, N. Y.

DU PONT Rubber Chemicals
DU PONT RUBBER COLORS
DU PONT ACCELERATORS
DU PONT ANTI-OXIDANTS
E. I. du Pont de Nemours & Co., Inc.
RUBBER CHEMICALS DIVISION
WILMINGTON, DELAWARE

DUTREX
SHELL DUTREX 6—Plasticizer and Extender for GR-S
Chemically and Physically Controlled
Shell Oil Company, Inc.
50 West 50th St., New York 20, N. Y.

"FACTICE"—Prevents blooming, makes colors fast and a smoother batch.
(Reg. U. S. Pat. Off.)
Stamford Rubber Supply Co.
Stamford, Conn.

FURNEX—FURNEX BEADS
The High Resilience Semi-Reinforcing Black
BINNEY & SMITH CO.
41 East 42nd St. New York 17, N. Y.

GASTEX
Special Process Reinforcing BLACK. Superior aging and oil resistant properties. Low permanent set.
Herron Bros. & Meyer, Akron, Ohio
General Sales Agents for
General Atlas Carbon
Pampa, Texas

IRON OXIDES
Asbestine—Barytes—Talc—Soapstone
C. K. Williams & Co.
EASTON, PA.

MAGNESIA
Calcined Magnesia—for neoprene
Carbonate of Magnesia—precipitated
The Philip Carey Mfg. Co.
Cincinnati Ohio

MAGNESIUM OXIDE
Calcined Magnesium Oxide prepared for use in the compounding of neoprene. Full details on request.
J. T. Baker Chemical Co.
Phillipsburg New Jersey

MAGNESIUM OXIDE
Extra Light—Original neoprene type
Also Light, Medium and Heavy types
General Magnesite & Magnesia Co.,
2960 East Venango St., Phila. 34, Pa.

MICA
"CONCORD" Wet Ground Mica
Its *White, Pure* and *Uniform*
Send for Samples and Prices
CONCORD MICA CORP.
Penacook Station Concord, N. H.

MOLD LUBRICANT
"Orvus" enables articles to leave molds readily; molds clean easily. Effective in hardest water. Also acts as thorough cleanser for molded and extruded rubber goods.
PROCTER & GAMBLE
Cincinnati Ohio

OROPLAST
Plasticizer—Sulphur Reactive
High Loading Tolerated
Great Elongation Produced
Cool Processing Stocks
Advance Solvents & Chem. Corp.
245 Fifth Ave., New York 16, N. Y.

PARA-FLUX
The Universal Softener—Adaptable, Uniform. Improves Quality—Economical.
The C. P. Hall Co.
2510 First Central Tower
Akron Ohio

PELLETEX (The pellet *Gastex*)
The special process reinforcing black in free-flowing form. Saves power; none wasted; protects adjacent colored stocks.
Herron Bros. & Meyer, Akron, Ohio
General Sales Agents for
GENERAL ATLAS CARBON
Pampa, Texas

PHILBLACK A
NEW HMF TYPE BLACK
Offers: Excellent Processing — Low Hysteresis, and High Abrasion.
Phillips Petroleum Company
Philblack Division
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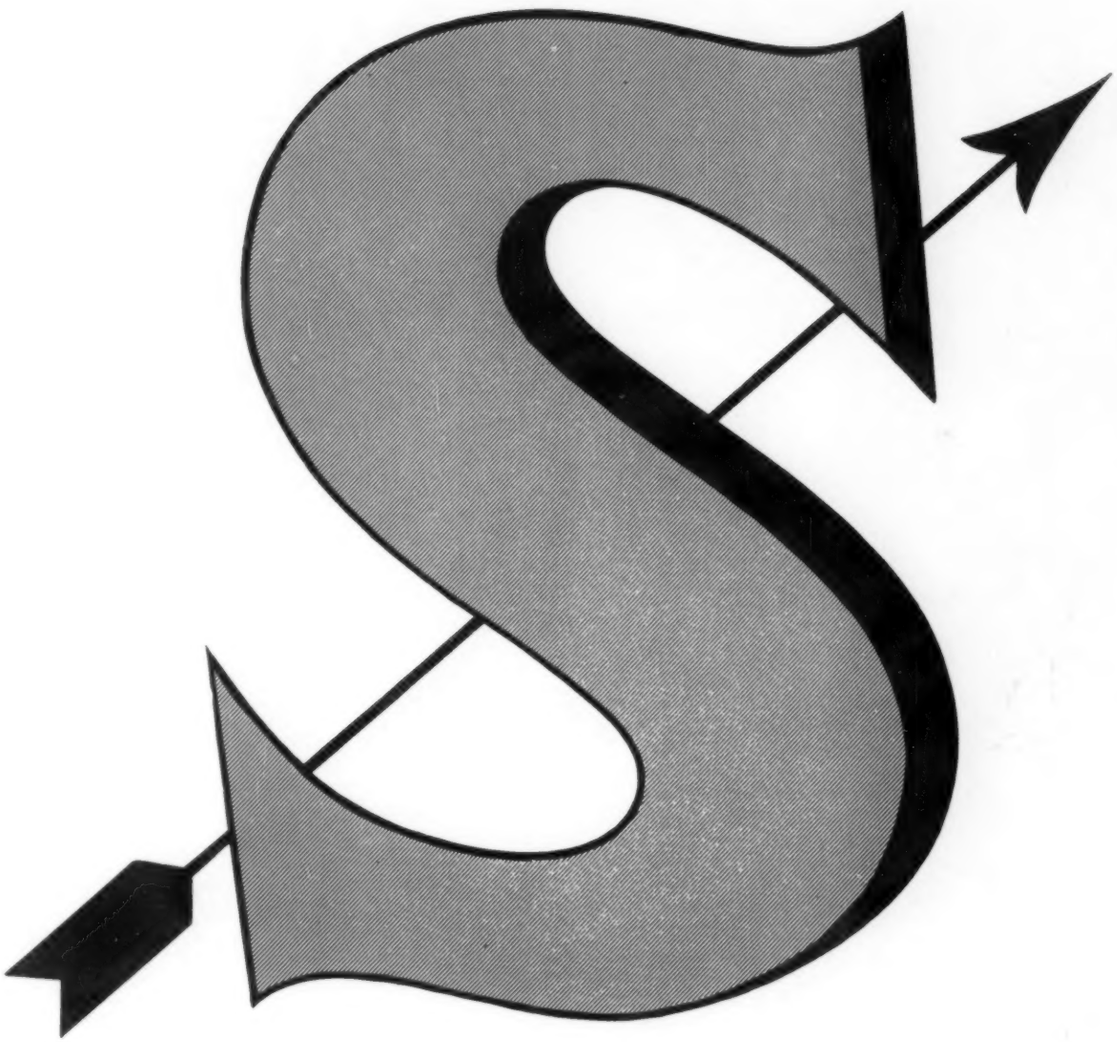

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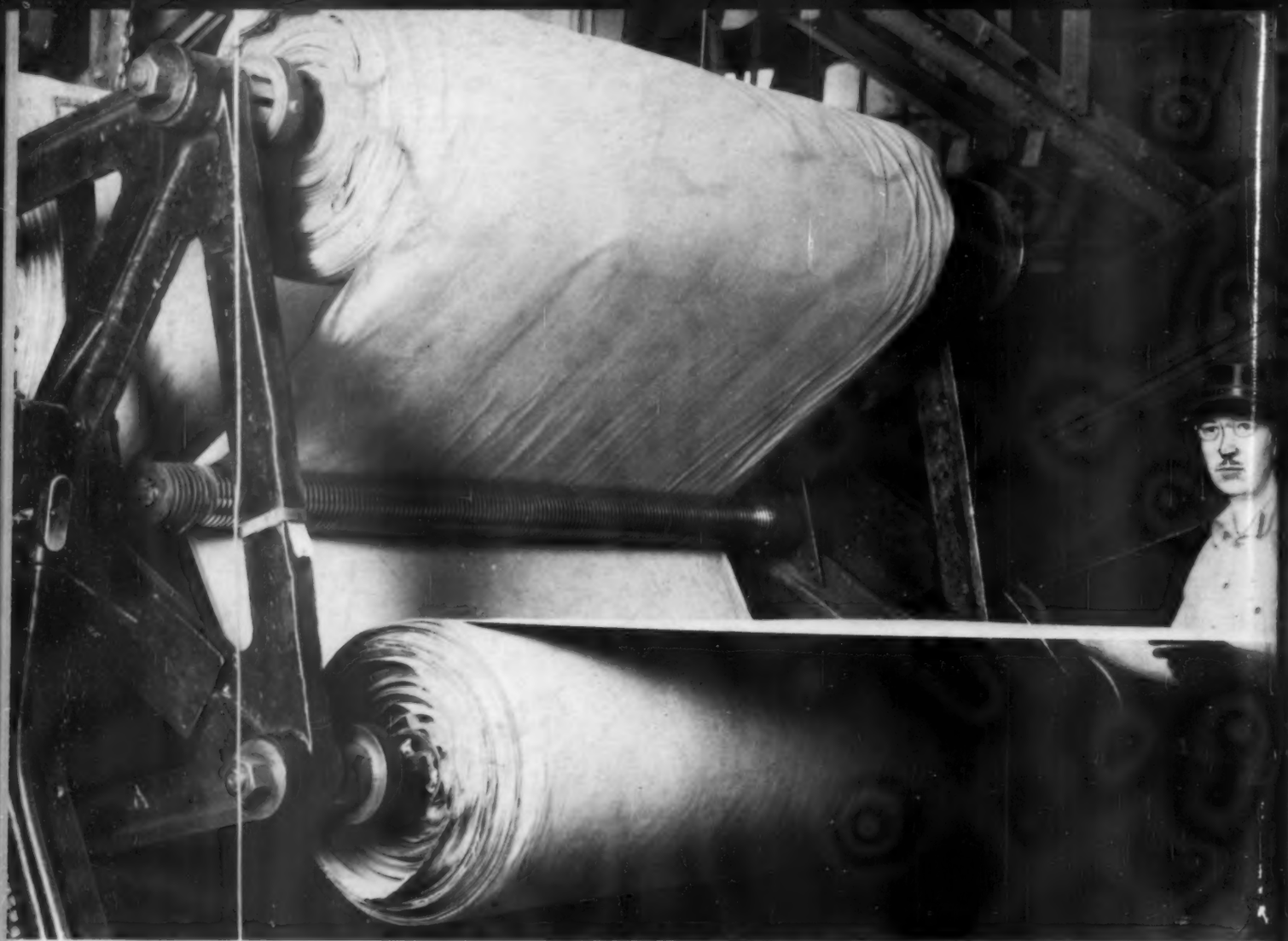

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